Vol. 193 83rd Year No. 3529

THE GAS JOURNAL

JANUARY 7, 1931

A Glance at the Contents—

New Showrooms at Jersey.

Photographs on a later page give an idea of the attractive showroom premises which have just been opened by the Jersey Gas Light Company, Ltd.

University of Leeds.

We publish the programme of Special Courses of Evening Lectures for the Session 1930-31 of the Department of Coal Gas and Fuel Industries with Metallurgy.

The Therm System in Japan.

Mr. T. Akiyama, of the Accounting Department of the Tokio Gas Company, writes to inform us that his Company have introduced the therm system of charging for gas in their Chita territory.

Another Amalgamation in the London Area.

The Directors of the Sutton Gas Company have unanimously resolved to enter into a provisional agreement for the amalgamation of the Company with the Wandsworth, Wimbledon, and Epsom District Gas Company.

New Waterless Holder at Hyde.

The opening ceremony of the new waterless gasholder, erected at a cost of £20,000 by the Hyde Gas Company, took place on Dec. 29 in the presence of Directors and Officials of the Company, and Officials and Gas Engineers of neighbouring undertakings.

"Gas Journal" Directory.

The 1931 Edition of the "Gas Journal" Calendar and Directory is reviewed in our columns to-day by the President of the Institution of Gas Engineers, Mr. Harold E. Copp, M.Inst.C.E., Engineer and Manager, Hull Station of the British Gas Light Company, Ltd.

Gas Dehydration at The Hague.

Writing in the issue of "Het Gas" for Dec. 15, 1930, Mr. J. Rutten, Director of the Municipal Gas Department, The Hague, gives a summary of the costs of the gas drying process at their works. The plant was designed and erected by Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, and a translation appears in the "JOURNAL" to-day.

Statute and Case Law of 1930.

Notwithstanding that the Companies Act, and Gas Undertakings Act of 1929 have been in operation during the past twelve months, comparatively few cases of great importance have reached the Courts, but notes in our columns to-day indicate the increasing number of Acts and cases which directly or indirectly affect our readers.

Sampling and Analysis of Coal for Export.

The British Engineering Standards Association have issued a British Standard Specification for the Sampling and Analysis of Coal for Export Purposes. A Report by Dr. E. S. Grummell and Dr. A. C. Dunningham, of Imperial Chemical Industries, Ltd., on the Sampling of Small Fuel up to 3 in. has also been issued. A review of these is published to-day.

Results of Institution Examinations in 1930.

We publish to-day the names of Candidates who were successful in the 1930 Examinations of the Institution of Gas Engineers in Gas Engineering and Gas Supply, held under the revised Regulations of the Education Scheme as approved by the Council of the Institution of Gas Engineers, the Government Education Departments of Great Britain and Ireland, and the City and Guilds of London Institute.

Vertical Retorts at a Scottish Seaport.

An illustrated description is published of a Glover-West installation of vertical retorts at Grangemouth. The installation is the fourth to be erected in Scotland on a design which is specially suitable for works with an annual demand of from 25 to 60 million c.ft. Over an observed period of 72 hours the measured yield was 16,365 c.ft. of gas per ton, using mixed washed Scotch doubles and making gas at 472 B.Th.U. per c.ft., equivalent to 77·2 therms per ton.

Scottish Western Juniors at Glasgow.

On Wednesday, Dec. 10, about fifty members of the Scottish Junior Gas Association (Western District) visited the works of Messrs. G. & J. Weir, Ltd., Cathcart, Glasgow. A description of the Works is given. After the visit, the members were entertained at tea. Mr. D. D. Melvin, President of the Association, expressed the thanks of the Association for the hospitality shown; and Mr. Parker (Messrs. Weir) expressed, on behalf of the firm, great pleasure in having the Juniors as visitors.

Modernization of Baldock Gas-Works.

An article on a later page to-day describes an improved type of carbonizing plant, of particular interest to small gas undertakings, which has recently been inaugurated at the Gas-Works of the Baldock Gas Light & Coke Company. The entire plant was erected by Messrs. Gibbons Bros., Ltd., of Dudley, and the retorts are of special fireclay quality 12 ft. in length tapered from 21 in. to 15 in. ⌂ section to 23 in. to 15 in. ⌂ section, with an ultimate carbonizing capacity of 200,000 c.ft. per diem.

Pipe Joint Research.

We reproduce a progress report presented to the American Gas Association by Mr. K. R. Knapp, Research Engineer, American Gas Association Laboratory. The report covers work done up to Aug. 31, 1930, and relates to bell and spigot joints. Among the subjects either receiving attention at present or to be taken up in the near future are investigation of the use of rubber rings in the repair of leaking joints, application of leak clamps to large mains, continuation of tension and compression tests on large and small joints, study of vibration using the telemeter, and testing of mechanical joints.

Gas at the Schoolboys' Exhibition.

The Gas Light and Coke Company are exhibitors at the "Daily Mail" Schoolboys' Exhibition, opened at Olympia on Jan. 1, and demonstrate in an understandable and comprehensive manner the large number of useful purposes to which gas can be put. In addition to a very interesting stand on the ground floor, the Company also arranged an exhibit in co-operation with the London County Council.

EDITORIAL NOTES

Our Present to Subscribers.

WITH the help of our friends throughout the industry, enthusiastic work on the part of the printers, and unremitting labour by ourselves, the 1931 "Gas Journal Calendar and Directory" was despatched to subscribers before the departure of the Old Year. Since that time, our post-box has provided ample evidence of the safe receipt of the book by readers to whom it has been addressed. It has, indeed, provided eloquent tentimony to something even more gratifying to us—that is, widespread approval.

From all quarters there come expressions of opinion in favour of the new form of the book, on the score of convenience and ease of reference, as compared with the pocket book edition formerly issued. In addition to this consideration, of course, the extra space available has made possible the inclusion of a great deal of invaluable information, for the compilation of which we are indebted to Col. William M. Carr. The nature of this information is indicated by the review in later columns of this issue, which has been kindly undertaken by Mr. Harold E. Copp, President of the Institution of Gas Engineers. To what he says, we would add nothing; the object of this note is to do what, regretfully, we are unable to do individually—namely, to acknowledge the overwhelming number of letters received, the tenor of which has been such as to reward us amply for the mental and material effort involved in the preparation of the "Calendar" in its improved form.

The Four Types of Coal.

LAST week these columns were devoted to a review of the progress of our industry during the year which has just passed, and it was impossible for us to call particular attention to a valuable study of the parts played on carbonization by the four types of coal—vitrain, clarain, durain, and fusain—which are interbanded in most seams. This work was carried out by Mr. C. P. Finn, whose name is familiar to most of our readers, and was described in the "JOURNAL" for Dec. 31. The contribution is really divided into three parts—a detailed account of the properties of the four types of coal; "small-box" tests (15 lb. charges carbonized in a coke oven); and "large-box" tests (160 lb. charges carbonized in a coke oven).

To our mind the most interesting conclusions reached by Mr. Finn relate to fusain, which is non-caking and yields an incoherent powder in the crucible volatile-matter test—a fact which has led most writers to conclude that the presence of fusain in a coking slack is deleterious. The present author now shows that this constituent, though itself non-coking, is valuable when uniformly admixed with the remainder of the coking slack and when present to an extent not exceeding about 5 p.ct. Indeed, Mr. Finn suggests that fusain is even more important than vitrain, and that, if possible, high volatile coal should be treated to conserve the fusain for use in the coking slack. In a screening plant, he says, much fusain is lost in the fine dust, and in a washery much of it floats on the surface of the wash-box and settling-tank, being then obtained in a form in which it cannot be uniformly admixed with the rest of the coal. The remedy is to screen out the smallest sizes of dust before washing, and collect the dust produced during screening. The dry dust, rich in fusain, may then be added in definite proportions to the coking slack and uniformly admixed.

Another conclusion drawn by Mr. Finn is that, on available evidence, vitrain is more valuable than clarain in a coking slack. Different samples of clarain, which forms the largest percentage of the banded ingredients present in a coking slack, may vary considerably in their coking properties, but yield a comparatively poor coke that is much fissured and breaks easily. As for durain, this appears to exert little effect when present in a coking slack. It follows from the foregoing that it would be advantageous to increase the percentage of vitrain; and this is what Mr. Finn has to say about the matter: "It is not easy to increase the percentage of vitrain in a coking slack, but since the friability of vitrain will probably lead to its concentration in smaller sizes (slack compared with nuts, for example), this may be a contributory factor in the known better quality of coke obtained from slack than from crushed large coal and from clean slurry compared with slack. Regarding coke hardness as being of primary importance, it would appear to be advantageous to screen out the coking slack at as small a maximum size as possible to increase the percentage of vitrain present."

Monthly Account System at Brighton.

GLANCING through the December issue of the Brighton and Hove General Gas Company's "Co-Partnership Magazine," the following paragraph was noted: "We hear that monthly gas accounts and mechanical accounting will be in vogue before our next Christmas number." This recalled to mind the references to the subject of monthly accounts which were made in the "JOURNAL" some time ago. Now, in a period of even greater financial stringency, any arguments adducible in favour of the system might be regarded as possessing added power. In the first issue published last March, when repeating the favourable experience of the Portland (Maine) Gas Light Company, whose meters, numbering some 15,000, are read monthly, on the same date each month, we remarked that the system of monthly accounts, already adopted in this country by the South Metropolitan and South Suburban Gas Companies, "is an important matter, of which more will undoubtedly be heard as time passes," and now we have the announcement that the Brighton Company have decided to join the ranks. There are some other undertakings using mechanical accounting.

The contention that, at a time when so large a proportion of the population budget on a monthly basis, the monthly account is likely to be more generally convenient among those of modest means, seems irrefutable; and, of course, as already remarked, additional emphasis is laid on this by periods of financial stress. Quite recently it was stated in our columns that "the Darwen Gas Department are gradually replacing quarterly meters with slot meters, to help people in straitened circumstances to keep pace with their accounts. Prosecutions for non-payment of bills have brought in full view the severe hardships through which many are passing." This is much the point that was raised by Alderman J. H. Waddington, of Halifax, twelve months ago. Addressing the West Riding of Yorkshire District Conference of the B.C.G.A. at Huddersfield, Alderman Waddington remarked that the country was passing through a period of depression, and that the large quarterly bill was working against the industry. His contention that the finding of the big money needed for a quarterly account is a real hardship to great numbers of people, and that gas undertakings should help them in this direction, together with the news now to hand from Darwen, shows that this matter is receiving the attention of municipalities as well as of companies.

Joints and Jointing.

On later pages of our issue to-day will be found a progress report on pipe joint research presented to the American Gas Association at their last annual meeting; and it is well worth reading. In common with most problems tackled by the A.G.A., the research under review is characterized by its thoroughness, its practical nature, its wide scope, and its obvious spirit of keen co-operation between what may be termed those within and without the American gas industry. Actually, the last definition is not a good one; in America "within" and "without" have little meaning—both the manufacturers of plant and appliances and the gas makers and distributors themselves are essentially "within." It is this, we suggest, which produces such good results so quickly. The investigation on pipe joints was commenced at the A.G.A. Testing Laboratory at Cleveland eighteen months ago, and the report we publish covers the work to the end of last August—work which consists of three parts: A study of old joints removed from service, to determine the best means of repairing them; the testing of new joints; and a study of jointing materials.

Regarding the first phase of the problem, investigation was made of thirty leaking joints, ranging in size from ¾ in. to 8 in., received from various parts of the United States. The method of investigation is of extreme interest, ingenious test procedures being devised, which are detailed in the report. As a guide to the type of repair to be attempted, a questionnaire was sent to a number of distribution engineers throughout the country; and an analysis of the replies showed that the recommended methods of repair could be grouped into three general classes: Cut out old joint material and remake joints; recaulk; apply leak clamps. And the report, having outlined the tests, states that "the general results from the application of leak clamps are much more satisfactory than anything else attempted to date for the permanent repair of small ball and spigot joints." The report then goes on to describe the test for ascertaining the effect of temperature variations on pipe joints—how the effects of temperature changes over a 25-year period were reproduced. The results which accrued from this method of testing (alternate tension and compression) are valuable. They point to the advisability of employing pneumatic, as distinct from hand, caulking in the preparation of both cement and cast lead joints. "Hand-caulked cast lead joints," states the report, "have been found decidedly unsatisfactory, and considerable trouble was found in securing initial tightness. Cast lead joints air-caulked were greatly superior. . . . All the work thus far completed on large joints appears to indicate strongly the superiority of those in which a pneumatic hammer is used over those hand-caulked. . . . It appears desirable . . . to utilize pneumatic caulking to the greatest possible extent."

Miscellaneous tests were carried out on cement, lead, yarn, and vibration. The last-named investigation is of particular interest in view of the statement made that "it appears unlikely that such vibrations as are caused by ordinary traffic are of sufficient intensity to have much effect as a primary cause of leakage." An instrument called a "telemeter" is being used by the A.G.A. for vibration measurements. This instrument consists of an adaptation of a strain gauge in which a series of carbon elements is held together under a certain pressure controlled by a screw. The arrangement is such that any movement or vibration of the object to which this mounting is attached causes a change in pressure on the carbons, and thus changes their electrical resistance. The extent of this change is indicated by the deflection of a galvanometer, the light beam being thrown on a moving film driven at a fixed speed by a motor. "The instrument," it is remarked, "is quite delicate and capable of measuring vibrations of small magnitude." Doubtless many distribution engineers in this country will be interested in this device.

The work dealt with in the report is really in its early stages, and no definite recommendations have yet been put forward. The programme which the Pipe Joint Research Committee have planned is a most ambitious one, as will be gathered from the concluding paragraphs of the report. Among the subjects either at present receiving attention or to be taken up in the near future are investigation into the use of rubber rings in the repair of leaking joints, the application of leak clamps to large mains, continuation of vibration tests using the telemeter and of tension and compression tests on large and small joints, and the testing of "mechanical joints;" and we look forward to the publication of the results of these investigations.

Gas as an Investment.

The editorial columns of last week's "Journal" emphasized the excellent standing enjoyed by the gas industry from the investment point of view, and we are once more reminded of the fact by the "Financial Times" review of the Money and Stock Markets in 1930. For the most part, this review affords dismal reading, and amply bears out its opening words: "With the best will in the world, it is difficult to bestow many charitable thoughts on the year just concluded." Gilt-edged stocks as a class exhibit on the year substantial rises in quotations; but glancing over the other markets there is evidence enough and to spare to show how far astray it is possible for the investor to wander in unpropitious times if he fixes as his goal capital appreciation rather than assured interest yield. In the minds of those who concern themselves with such matters, much of this evidence will be still fresh; it is scattered throughout the markets. In Home Rails, Great Western ordinary stock has fallen from 90½ a year ago to 68, London and Scottish from 54¾ to 33, and North-Eastern from 37⅞ to 16½. Again, we see a heading "Unrelieved Industrial Weakness—Collapse in Share Values." The third heading reveals the cause: "General Decline in Earnings and Lack of Confidence."

He would indeed be a robust optimist whose confidence did not suffer some slight diminution from the figures quoted in connection with industrial securities. The "Financial Times" separates them out in sixteen sections of representative undertakings. In seven of these sections there is not one gain recorded when comparing the quotations at the end of 1930 with those of twelve months before, while four other sections display only one or two cases of appreciation in value. There is but a single section which comprises all gains, and that is devoted to Gas and Electric Lighting. It is true that the section includes only three large gas companies and five similarly representative electricity companies; but, as the table published by us a week ago showed, had a larger number of gas concerns been quoted, the result would have been equally gratifying. Among eight electrical equipment companies quoted in another section, there is but one instance of an increase in value compared with the share quotations a year ago.

We will not follow the example of the shoemaker, by claiming that there is "nothing like gas," but at any rate those investors who desire to ensure untroubled sleep may take a hint from what has here been said.

Further Experiences of Gas Drying.

The latest Report of the A.G.A. Committee on Dehydration is indicative of the favourable opinion of the United States gas engineers in regard to the matter of gas drying. "The equipment," it is remarked, "is so simple and the operation so easily regulated that it is rapidly being accepted as standard equipment just as necessary as any other in the condensing system." There are at present in America only three—or at the most four—gas drying plants in operation. In England there are already 49 or 50 plants using calcium chloride, and there is the Colwyn Bay plant employing glycerin; and it seems that before very long the number will increase in America. The A.G.A. Report in question deals with the experience of an installation at Grand Rapids treating 5 million c.ft. of mixed coal gas and water gas per day. At first sodium thiocyanate solution from the sulphur recovery liquid purification plant was the hygroscopic solution used. After a full year of operation with this solution a calcium chloride solution was substituted, and a year of service

has just been completed with that solution. This change was made to compare the behaviour of these two solutions, but to date no definite conclusions are made. We look forward to these with interest. The experience at Grand Rapids has been highly satisfactory. This is particularly so in regard to the condition of consumers' meters which have been tested, the percentage of "O.K." meters having increased in marked degree since dehydration was commenced. "The appearance of the meters brought in for stripping is very encouraging. The metal parts are always clean and bright, and show no indication of gummy deposits on valves or other moving parts."

Two exceedingly interesting facts are brought out in the report. The first is the reduction in pumping pressures required for fixed loads, due to the removal of naphthalene, and the second relates to the determination of the temperature of the gas in the distributing system, to find what is a suitable control point close to the plant which will indicate the required amount of dehydration at various seasons of the year. It is pointed out that there are two factors affecting the temperature of the gas in the distribution system—namely, gas temperature at the outlet of the holder, and ground temperature. The gas temperature at the holder outlet is in turn affected by the temperature of the gas entering the holder, the rate of gas flow through the holder, and the atmospheric temperature. The effect of holder outlet temperature on the distribution main gas temperatures is eliminated in favour of ground temperatures in direct proportion to the length of time the gas remains in the distribution mains, and it is obvious that often the gas at points distant from the works has not been exposed to ground temperatures for a sufficient length of time to recover from the effect of holder outlet temperature. Gas temperature carries well above the ground temperature line when the atmospheric temperatures are well above it, and similarly it falls below the ground temperature line during the months of low atmospheric temperatures.

In our columns to-day is a translation of an article by Mr. J. Rutten, Director of the Municipal Gas Department, The Hague, which appeared originally in "Het Gas." He outlines his experience with a Holmes "Dri-Gas" plant, which, he says, "has been working continuously for about one year, and has proved to need very little supervision or attention." This plant is of particular interest in that it is situated at the outlet of the holders. Mr. Rutten gives the daily operating costs over a period of six months (the first half of 1930). The total cost is only 0·11d. per 1000 c.ft. of gas treated, including interest and amortization, labour, maintenance, and all other charges. And this cost will be less as gas production increases at the works.

January "Gas Salesman" Publication Date.

Will subscribers to the "Gas Salesman" please note that the January issue will be published on the 24th of this month, instead of the 17th? January happens to be a five-Saturday month, and this alteration in the date of publication will enable us to mature plans for making the paper still more attractive to readers.

Local Authorities and Trade Effluents.

The Report of the Water Pollution Research Board for the year ended June 30, 1930, together with the Report of the Director of Water Pollution Research, has just been published (H.M. Stationery Office, Adastral House, Kingsway, W.C. 2, price 9d.). In it mention is made of the evidence which the Joint Advisory Committee on River Pollution (Ministries of Health and of Agriculture and Fisheries) received and considered on questions relating to the admission of trade effluents into the sewers of local authorities. This question was dealt with in a recently published report of the Committee. The recommendation is made that the local sanitary authorities should be under a general obligation, subject to certain conditions, to take and dispose of the trade effluents of their district, and that the trader should have a correlative right to discharge such liquids to the public sewers. It is also recommended that the local authorities should be empowered to make general regulations governing the exercise by the trader of this new right and imposing necessary safeguards and conditions with which he must comply. By means of these regulations it should be competent to the local authority to call for necessary preliminary treatment and the removal of specified substances, when practicable, and for the regulation of the rate and volume of discharge; to impose reasonable charges for the facilities afforded; and to provide for the proper measurement of quantities, inspection of effluents, and taking of samples.

Amalgamations.

The first instalment of notices of Private Bills relating to gas supply which it is intended to promote in the coming Session of Parliament (published in to-day's issue of the "Journal") foreshadows the transfer to the Gas Light and Coke Company of the undertakings of the Southend-on-Sea and District Gas Company and of the Brentwood Gas Company; while the Guildford Gas Light and Coke Company announce their intention to take over the Cranleigh Gas and Electricity Company, Ltd. Our news columns, too, contain the statement that the Directors of the Sutton Gas Company have unanimously resolved to enter into a provisional agreement for the amalgamation of the Company with the Wandsworth, Wimbledon, and Epsom District Gas Company. This agreement is, of course, subject to the approval of the proprietors of both Companies and to a Special Order being made by the Board of Trade confirming the terms.

Forthcoming Engagements.

Jan. 10.—Western Junior Gas Association.—Meeting at Bristol. Paper by Mr. H. C. Widlake, of Plymouth.

Jan. 12.—Institution of Gas Engineers.—Meetings of Street Lighting Sub-Committee (12 noon), Executive Committee (2 p.m.), Finance Sub-Committee (3.30 p.m.), Finance Committee (4 p.m.), Benevolent Fund Committee of Management (4.30 p.m.), and Committee on Salaries of Gas Engineers (5 p.m.), 28, Grosvenor Gardens, S.W. 1.

Jan. 13.—British Commercial Gas Association.—Meeting of Education for Gas Salesmen Committee, 12 noon, at 28, Grosvenor Gardens, S.W. 1.

Jan. 13.—Federation of Gas Employers.—Meeting of Central Committee, 12 noon, 28, Grosvenor Gardens, S.W. 1.

Jan. 13.—Institution of Gas Engineers.—Meetings of Council (10 a.m.) and Gas Education Committee (4 p.m.), 28, Grosvenor Gardens, S.W. 1.

Jan. 13.—National Gas Council.—Meeting of Central Executive Board, 2.30 p.m., 28, Grosvenor Gardens, S.W. 1.

Jan. 14.—Institution of Chemical Engineers.—Meeting at Burlington House, Piccadilly, W. 1. Paper by Mr. C. F. Featherstone Hammond on "The Concentration of Phosphoric Acid Solutions by Means of a Submerged Flame."

Jan. 14.—Institution of Gas Engineers.—Meetings of Ammonia and Liquor Effluents Sub-Committee (10.30 a.m.) and General Research Committee (2.15 p.m.), 28, Grosvenor Gardens, S.W. 1.

Jan. 15.—British Commercial Gas Association.—Annual meeting of members in the Midlands district, at Birmingham.

Jan. 17.—Yorkshire Junior Gas Association.—Visit to Bridge Street Distribution Department, Leeds. Paper by Mr. E. R. B. French.

Jan. 20.—Society of British Gas Industries.—Council meeting in the afternoon.

Jan. 21.—British Commercial Gas Association.—Meeting of Executive Committee (11.30 a.m.), 28, Grosvenor Gardens, London, S.W. 1.

Jan. 22.—British Commercial Gas Association.—Annual meeting of members in the South-Western district, at Exeter.

Jan. 23.—Institution of Gas Engineers.—Meeting of Board of Examiners (2.30 p.m.), 28, Grosvenor Gardens, S.W. 1

Jan. 24.—Midland Junior Gas Association.—Visit to Works of Messrs. Edwin Danks & Co. (Oldbury), Ltd., Boiler Makers.

Jan. 24.—Scottish Junior Gas Association (Western District).—Visit to Messrs. Alder & Mackay, Ltd., Edinburgh.

Jan. 28.—British Commercial Gas Association.—Annual Meeting of members in the Northern district, at Newcastle-upon-Tyne.

Jan. 29.—British Commercial Gas Association.—Annual meeting of members in Scotland, at Glasgow.

Jan. 30.—London and Southern District Junior Gas Association.—Paper by Mr. E. W. B. Dunning, B.Sc., "Incomplete Combustion; Its Importance, Recognition, and Prevention."

June 2-4.—Institution of Gas Engineers.—London Conference.

"GAS JOURNAL" DIRECTORY

The New Edition of the "GAS JOURNAL" Calendar and Directory, 1931, published by Walter King, Ltd., and presented to subscribers to the "GAS JOURNAL."

Reviewed by the President of the Institution of Gas Engineers,

HAROLD E. COPP, M.Inst.C.E., of Hull.

Gas engineers have, for some years, regarded the copy of the "Gas Journal" Calendar and Directory which they receive every year as their *vade mecum*, and I have no doubt that this publication reposes on the desk of nearly everyone who is charged with the responsibility of administering, or of guiding the fortunes of, any gas undertaking, be it great or small. It was a little red book, containing a mine of information, to which we have instinctively turned when we required to refresh our memories either for purposes of finding the place of abode of an old friend, the method of conducting a test with which we were so familiar in days long past, or for obtaining a new view of the trend of scientific progress as it particularly affects the gas industry. So great is the production of technical and commercial literature nowadays that, even if one was able to find time to discharge the obvious duties of life and, at the same time, be willing to sacrifice leisure in order to read with unremitting avidity the papers, articles, and speeches which are published in the pages of the Technical Press, the task would be found to be well-nigh impossible. The busy man, therefore, has reason to be thankful to the "GAS JOURNAL" for presenting such a large amount of information within so small a compass, to which he may refer for his daily requirements—and that without having to remove a large number of volumes from his bookcase, and also to replace them in their proper order when his task is accomplished.

Useful as the little red book admittedly was, its place has been taken this year by a more comprehensive volume handier in shape and printed in a type kinder to the eyes of those who are no longer young. In the foreword, the Editor dedicates the publication to the "vital cause of 'Service';" and I am sure that he will have the satisfaction of knowing from its many readers that a very real service has been rendered to the gas industry by a task so well accomplished.

At the beginning of the Almanack much useful data are given; and under the heading "Noteworthy Dates, 1931," it will be noticed that Buchan's cold and warm periods are recorded. I doubt whether many gas engineers will have the temerity to anticipate those dates by making much variation in their routine in order to deal with greatly altered climatic conditions to coincide with such periods.

The Advertisers' Directory and Buyers' Guide will be found very useful, containing, as it does, the names of manufacturers which, for the most part, are familiar to all of us, though we cannot always call them all to mind when considering our requirements.

Several new features are introduced into the "JOURNAL" Directory, notably particulars of the nature of the manufacturing plant employed and the percentage of gas sold at industrial rates. The various prices for gas are presented in a singularly intelligible form. The large consumptions of gas in the great cities of the Colonies and Dominions are particularly notable. Part 2 contains particulars of the Bye-Product Coke Oven Plants in Great Britain, which will be a very interesting feature in view of the attention which is at present being given to the questions of rationalization and the centralization of the sources of gas distribution.

Part 4 gives particulars of the numerous Gas and Allied Organizations of Great Britain and Ireland. District Associations are doubtless necessary in order to secure co-ordination of interests in different parts of the country where there are large centres of population served by groups of gas undertakings, but I am inclined to think that they are too numerous, and that if we cultivated more cohesion our interests would be better served; and, further, if the District Associations and the Junior Associations were more or less combined, we should the sooner be able to secure the active services of the younger men which are so necessary in fostering the virility of the industry.

The Memorandum by Col. W. M. Carr on Gas Legislation is a concise review of the existing Laws relating to Gas Undertakings, and will save the busy gas engineer many references to more or less musty Acts of Parliament which are invariably tedious and uninteresting.

The notes by Mr. H. T. Seymour on Income-Tax and Rating for 1931 will be found very helpful, and they throw much light on the continually increasing intricacies of both these subjects.

Then follow Chapters on Coal and Analysis, and Carbonization by various modern methods, including Complete Gasification. It would be impossible to enumerate in the space of a short article each of the multitude of other interesting matters which are dealt with in a clear and easily understood form, though all will well repay careful perusal; the Memoranda on Retort House Control and Water Gas Production being of special interest and quite new features.

The subjects of Electricity Plant on Gas-Works, and the Recovery of Waste Heat are closely allied. It is hardly safe to assume, however, that there is sufficient steam available on the average gas-works which can be generated by waste heat at such low running costs as those indicated, the waste-heat steam being a variable quantity depending on the nature of the plant of each individual works.

The Memorandum on the Dehydration of Gas also contains very useful information, and it is the first time I remember its being dealt with in any calendar or directory which has yet appeared.

The notes on Gasholders and the maintenance thereof are very welcome, and the recommendations practically coincide with those of the Committee on Gasholders which was set up by the Institution of Gas Engineers, who issued a circular letter enjoining all gas engineers to undertake periodical examination of gasholders.

The Chapter on Distribution contains useful tables and formulæ relating to the capacity of gas mains, and an interesting note on methods of gas charging—a subject which will soon require the consideration of every gas undertaking, excepting, perhaps, the few who are able to charge a very low flat rate with substantial discounts.

I should like to have seen some reference to the latest proposals for the cracking of tar vapours, and also to the new method of assaying coal and analysis of products with the new electrical furnaces which are now available in several forms for different purposes, by the use of which much valuable information must have been acquired, though little has been published.

The Chapter on General Information and Tables is written in a very attractive manner. I would commend the statement relating to electrical units to the study of every gas salesman, who should carry in his mind all the electrical units in general use, so that he may readily compare their values with gas, for both heating and lighting.

At the end of the volume will be found an Index to the Memorandum which will enable the reader to refer to any subject without loss of time. The volume is a noteworthy publication, and there will seldom be a day when a gas engineer may not refer, with advantage, to its pages.

PERSONAL

Mr. F. Livesey, M.Inst.C.E., who has been Engineer and General Manager of the Maidstone Gas Company for the last nineteen years, has been elected to a seat on the Board of that Company.

Mr. William Thomas Glover, Manager of Messrs. J. & J. Braddock, Globe Meter Works, Oldham, and Mr. Harold Barlow, Chief Representative and Manager of Messrs. George Orme & Co., Atlas Meter Works, Oldham, have been elected to the Board of Directors of Meters, Ltd., as and from Jan. 1, 1931.

Mr. William Mathieson, recently retired Joint Managing Director of Wilsons & Mathiesons, Ltd., of Armley, Leeds, has made a gift of six-and-a-half acres of land, lately purchased by him, as an addition to the Horsforth Hall and park which he presented to the public of the district some months ago. This makes a total gift of 35 acres and the hall.

Sir Harry McGowan, President of Imperial Chemical Industries, has been elected Chairman and Managing Director of the Company, in succession to the late Lord Melchett. The Marquess of Reading has been elected President.

Mr. Harold L. Bowman, a member of the staff of the Bingley Urban District Council Gas Department, has been appointed Chief Distribution Superintendent to the Cradley Heath Gas Company, Staffordshire.

On Jan. 1, Mr. T. Leonard Bott entered the employment of Messrs. Broadhead Constructions, Ltd., Manchester, in the capacity of Erection Manager and Representative. For over thirty years Mr. Bott has been in the employment of Messrs. C. & W. Walker, Ltd., Donnington, the last fourteen of which he has been on their staff as Assistant Works Manager and Supervisor of Construction and Erection.

OBITUARY

The death is announced of Mr. Thomas Rhodes, a former Manager of the Atherstone Gas Company.

CORRESPONDENCE

The Therm System in Japan.

Sir,—Having been granted official permission on Dec. 3, we decided to adopt the therm system of charging for gas in our Chita territory, being the first to adopt this practice in our country. We shall extend the system to other territories if its trial in Chita gives satisfactory results. I believe that the therm system will prevail in Japan before long.

T. Akiyama,
Accounting Department of the Tokio Gas Company.

Western Juniors.

Sir,—Your report, on p. 860 of the "Journal" for Dec. 10, of our recent visit to the Great Western Railway Gas-Works, Swindon, gives the impression that coal gas is used in the railway dining cars, &c.

The first sentence in paragraph 3 should have been placed at the beginning of paragraph 5 and should have read "The oil gas plant produces gas for use in railway dining cars, &c."

W. M. Paterson,
Hon. Secretary.

Gas-Works, Bath,
Dec. 22, 1930.

Gasholder Repairs.

Sir,—We are glad to have an opportunity of replying to Mr. R. W. Broadhead's criticism of the article "Re-crowning an Inflated Holder" published in the Dec. 17 issue of the "Journal," particularly as that criticism raises two questions of general interest. First, the saving of time, and, secondly, the safety of welding as applied to gasholders.

The chief object of time saving is, of course, to cut down the length of time the holder is out of service. Mr. Broadhead instances a very creditable performance on another holder, and by some wonderful logic reduces the time allowance for re-crowning the Birmingham University holder to one day. Let us accept his figure. If welding save a single day, it is worth while, but in this case the holder remained in service without any interruption at all.

Our critic then brings us to a point on which we should like to hear further views. Is it safe? Explosive mixtures and electric arcs demand consideration. They are only safe when under perfect control, and we should prefer to eliminate risk rather than take it.

Our experience shows there is no real danger in the miniature fires of accumulated tar or the jets of neat gas that are occasionally produced under the electric arc. The heat is so localized that any resulting flame succumbs immediately to prompt attention. It is the formation and accumulation of explosive mixtures that must definitely be avoided. In the case of the Birmingham University holder two precautions were considered advisable. The bad places in the old crown were first sealed against possible leaks, then, after assembling the new crown, the space between the old and the new crowns was treated to exhaust any chance explosive mixture before making the final weld.

That most repairs can be successfully and expeditiously carried out by welding has already been demonstrated. We do not advocate the process indiscriminately, but where repairs to inflated holders can be planned to proceed under safe conditions, it would be folly to ignore the many advantages that welding offers.

The saving in time and trouble is most appreciated by those responsible for the maintenance of the gas supply. A saving is usually effected in the cost of repairs, and the near-by residents are spared all the noise associated with riveting.

We are definitely of the opinion that welding, properly administered, will enable any gas-works contractor with the right sort of experience to give more and better service to the industry.

Thomas Piggott & Co., Ltd.

85, *Lionel Street,*
Birmingham, Jan. 1.

Waste-Heat Recovery from Horizontals.

Sir,—I am extremely grateful to Mr. Moore for the interest which he has shown, and for the excellent manner in which he has commented on my paper. I trust that the following reply will clear up the points which have been raised.

In the first place, the fact that the figures given for the "Total Heat Used in Carbonization" are taken to eight significant figures is due entirely to the method used in obtainisg this figure. The following schedule of heat balance shows the method adopted, and will no doubt also explain what is meant by the terms "Total Heat Used in Carbonization" and "Total Heat Lost via Surplus or Waste Gases."

Heat Balance for No. 23 Bed.

[The following figures are the average results over a period of six days.]

Positive Heat.	B.Th.U. (Average)	Negative Heat.	B.Th.U. (Average).
Sensible heat in fuel	106,155	Loss due to decomposition of water	2,874,415
Sensible heat in water—		Sensible heat in ashes	
In fuel	32,497	and water	1,126,778
Injected	558,370	Potential heat in ashes	1,315,941
In primary air	17,726		
Sensible heat in primary air	440,296		
Heat due to combustion (C-CO)	19,191,620		
Total positive heat	20,346,664		
Total negative heat	5,317,134		
Total positive heat leaving producer	15,029,530	Total negative heat	5,317,134
Sensible heat in producer gas	13,163,548	Sensible heat in waste gases	27,022,765
Sensible heat in secondary air	9,721,099	Potential heat in waste gases	1,145,988
Heat due to combustion ($CO-CO_2$) (H_2-H_2O)	47,818,814	Total heat in waste gases	28,168,753
Total positive heat	70,703,461	*Less* heat gained by secondary air	9,157,109
Total negative heat	19,011,629		
Total heat used in carbonization	51,691,832	Total heat lost *via* surplus or waste gas	19,011,644
Fuel consumption, p.ct. (ash-free dry)	13·54		

It will be seen that the fuel consumption for the above tests is 13·54 p.ct. (calculated on ash-free dry basis), and I quite

agree with Mr. Moore that this is much higher than the 10·4 p.ct. commented on. This figure was the result of a test carried out on No. 1 Bench of 9 beds previous to the installation of No. 2 Waste-Heat Boiler, and has no connection whatever with the above list, being included merely to indicate the method of assessing the results that might be obtained if a waste-heat boiler was installed. The fuel consumption in the first test is low, as during the test heavy charges of dry coal were carbonized, and hot coke was fed to the producers, whereas in the case of the second test on No. 3 Bench smaller charges of washed smalls were carbonized and cold coke was fed to the producers.

The heat lost per lb. of fuel fed to the producers is obtained by dividing the total weight of coke in pounds into the total heat in the waste gases.

The figure of 125 p.ct. excess air in the waste gases corresponds to a CO_2 content of 12 p.ct. This statement is based on the examination of numerous samples taken from the settings. It does not mean excess secondary air.

The results obtained from the experiment carried out on air infiltration are based entirely on the analysis of various samples of the waste gas, and actual temperatures taken, there being no theoretical assumptions.

The theory that the efficiency of heat recovery is proportional to the velocity of flow of the gases in the tubes is based on the results of tests I carried out on the flow of gases through the tubes, and also supported by those of an American Engineer, Mr. C. R. McDermott, who states: "The molecules of the gas come in contact with the heating surface of the boiler and impart their heat. The rate at which this heat is imparted to a unit surface is dependent on the number of gas molecules which pass each unit of heating surface in a unit of time, and, consequently, the greater the number of hot molecules that will hit or penetrate into the adhering gas film and replace cold molecules of gas. Thus the dislodging effect of these moving molecules on the molecules of the adhering film will be proportional to the volume of the mass of the gas over the heating surface."

Thus the effect of increasing or decreasing the velocity dependent upon the volume of the gases has a marked result on the heat transmission.

I regret that, owing to an error in the copy sent to the "JOURNAL," the figure of 2022 lbs. should read 2222 lbs., and the evaporation per hour in the "Monday" column 4900 instead of 4970, making item (21) 2·33 lbs. and item (22) 1·17 lbs.

Item 21 is quite correct, being calculated from the fuel fed to the producers per hour, and the actual steam generated per hour. Thus it is quite in order to say "Evaporation per hour per lb. of fuel."

Item (26) is the theoretical assumption of what approximately should be expected from the waste gases available. The difference between (21) and (26) is the result obtained in actual practice over the theoretical assumption.

Owing to the loss due to radiation being reduced almost to a minimum—viz., 7° Fahr. in the water zone and 21° Fahr. in the steam zone—this was not included in the "percentage heat recovered." This figure was obtained as indicated by Mr. Moore.

The figure of 180° C. for the saturated steam temperature was the result of hourly readings taken over a period of six days, and therefore appears to be quite correct. The fact that the steam is rendered remarkably dry may account for this somewhat high figure.

The degree superheat was calculated by subtracting the saturated steam temperature from the superheated steam temperature. Thus, taking "Monday's" reading, we get a difference of 95·5° C. From the formula

$$^{\circ}\text{Fahr.} = \frac{^{\circ}\text{C.} \times 9}{5} + 32$$

we get 203·9° Fahr., which was tabulated as 204° Fahr., and appears to be quite correct.

The "extraction efficiency" of a boiler is its "TRUE EFFICIENCY." In order to obtain a 100 p.ct. efficiency, a waste-heat boiler must reduce the gases leaving it to a temperature equal to the temperature of the saturated steam. The extraction efficiency is thus calculated from the following formula:

$$\frac{T_1 - T_2}{T_1 - T_S} \times \frac{100}{1}$$

where T_1 = temperature of gases at boiler inlet
T_2 = " " " " " outlet
T_S = " " saturated steam.

In the case of the water softening plant the boiler was blown-down once in 24 hours, against 3 times in 24 hours following the installation of the "N.O.C." process. The blow down losses in each case were automatically taken into account in the net steaming efficiency, and should be included in the table for "water softener."

The "N.O.C." process is as described in the paper—an electrostatic process which prevents the deposition of scale, the solid matter and salts in the water being maintained in suspension and removed in the blow-down.

In reply to Mr. Moore's remarks on corrosion and the remarkable results which are claimed, I would say that any scepticism which one may have, and which we ourselves had, as to its achievement has been proved to be completely unfounded.

After six months in operation under the terms of the guarantee, No. 2 Waste-Heat Boiler was recently let down, and a thorough inspection carried out by an independent boiler inspector.

His report, which has just come to hand, states "There was complete absence of corrosion."

E. STROTHER DAVIES.

Stretford Gas-Works,
Jan. 3, 1931.

THE NEWS OF THE WEEK

Owing to Illness, Dr. Thau will be unable to present his promised paper on "The Continuous Production of Water Gas from Powdered Fuels" before the Institute of Fuel on Tuesday, Jan. 13. The meeting has, therefore, been postponed until Dr. Thau has sufficiently recovered.

Low Temperature Coal Distillers of Great Britain, Ltd., of 39, Grosvenor Place, S.W. 1, have been registered as a public Company limited by guarantee, with the objects of promoting, advancing, and protecting the interests of the industry of manufacturing smokeless fuel by low-temperature carbonization or other methods. Council: Col. W. A. Bristow (President), Lt.-Col. J. T. C. Moore-Brabazon (Vice-President), H. P. Hird, R. Maclaurin, J. E. Truzzell, and Lt.-Com. C. Buist (Hon. Secretary). The following are subscribers: Maclaurin Coal Products, Ltd. (R. Maclaurin, Director), 19, St. Vincent Place, Glasgow; British Carbonised Fuels, Ltd. (H. P. Hird, Director), 5, Manor Row, Bradford; "L. and N." Coal Distillation, Ltd. (J. T. C. Moore-Brabazon, Director), York Mansions, Petty France, S.W. 1; Sensible Heat Distillation, Ltd. (W. V. Waite, Secretary), York Mansions, Petty France, S.W. 1; Low Temperature Carbonisation, Ltd. (W. A. Bristow, Managing Director), 28, Grosvenor Place, S.W. 1; Doncaster Coalite, Ltd. (T. Instone, Director), 28, Grosvenor Place, S.W. 1; Petroleum Refineries, Ltd. (J. W. P. Clement, Secretary), 28, Grosvenor Place, S.W. 1.

The Transfer of the Worthing Gas Undertaking came under discussion at a meeting of the Worthing Town Council on Dec. 3, when Alderman Duffield, moving the adoption of the proceedings of the Finance and Law Committee, referred to the Report of the Sub-Committee who had been considering the matter. He said the report of their expert was of a private and confidential nature, and could be seen by members at the Town Clerk's office. They could appreciate the large expense in the first place for a new site; then there was the question of the cost of manufacture of gas at Worthing. In their negotiations they had gained one great point, and that was that there would be no gas manufactured at Goring, but the Company would still have the right to store gas there. They had also been able to get the name changed to the Brighton, Hove, and Worthing Gas Company.

THE NEWS—continued.

Suggested Abolition of Pressure-Wave System in Newcastle.

The Newcastle and Gateshead Gas Company have approached the Watch Committee with a view to the abolition of the pressure-wave system for public gas lamps in the city. The present system has been in operation since May, 1911, and if the City Council agree it will be changed to the clock system.

The capital cost of installing the controllers, estimated to be £10,235, would be borne by the Gas Company. The change-over would involve an additional expenditure by the Council of £1730 per annum to carry out the necessary maintenance work. The net additional cost would be £1375 per annum.

Institute of Fuel.

Presentation of the Melchett Medal and Melchett Lecture.

The Melchett Medal for the year 1930 (the first to be awarded) will be presented to Dr. Kurt Rümmel, of the Warmestelle, Dusseldorf, by the President (Sir David Milne-Watson, LL.D., D.L.), at the Institution of Civil Engineers, Great George Street, Westminster, S.W. 1, on Friday evening, Jan. 23, at 6.30.

Following the presentation, Dr. Rümmel will give the Melchett Lecture. The subject of his lecture will be "The Calculation of the Thermal Characteristics of Regenerators." Immediately following the meeting Dr. Rümmel will be the guest of the Institute at a Dinner to be held at the Connaught Rooms, Great Queen Street, Kingsway, W.C. 2.

Joint Gas Conference.

British Industries Fair.

A Joint Gas Conference will be held on Tuesday, Wednesday, and Thursday, Feb. 24, 25, and 26, at the British Industries Fair, Castle Bromwich, Birmingham; and the following preliminary arrangements have been made:

PRELIMINARY PROGRAMME.

TUESDAY, FEB. 24.

10.30 a.m.	Assemble at Conference Hall, British Industries Fair, Castle Bromwich. Opening of Conference.
11. 0 a.m.	Presidential Address by Sir Arthur Duckham, G.B.E., K.C.B.
1. 0 p.m.	Official luncheon at the British Industries Fair (delegates paying for their own luncheon).
Afternoon.	Inspection of exhibits at the Fair.

WEDNESDAY, FEB. 25.

10.15 a.m.	Assemble at Conference Hall, British Industries Fair.
10.30 a.m.	Address by Dr. C. H. Lander, C.B.E., M.Inst.C.E., on "The Gas Industry and Its Relation to the Fuel Problems of Great Britain."
1. 0 p.m.	Luncheon at British Industries Fair by invitation of the Fair Management Committee.
Afternoon.	Inspection of exhibits at the Fair.

THURSDAY, FEB. 26.

10.15 a.m.	Assemble at Conference Hall, British Industries Fair.
10.30 a.m.	Address by Sir Francis Goodenough, C.B.E., on "The Principles of Salesmanship."
	No special arrangements are being made for luncheon. The Conference will finish officially at about 1 p.m., and those members who wish to visit the Fair in the afternoon will be free to do so.

Growing Prosperity of the Gas Industry.

At this period of the year many of our National newspapers are publishing their annual Trade Supplements which ably cover the important trading and industrial interests in the various centres they represent. They are of value not only to experts in the branches of trade and industry concerned but to all who study the general trend of events.

It is satisfactory to note that the Gas Industry and kindred subjects receive their full due of attention in these publications and enable readers in many industrial districts to realize more definitely the very important part that gas plays in their daily lives, in both domestic and industrial spheres.

Under the above title appeared an article of this nature, on the continued progress of the Gas Industry, in the Annual Trade Supplement published by the "Western Mail and South Wales News" on Jan. 5. The writer remarks how refreshing it is, in these times of depleted order books, unemployment, and trade depression, to turn to an industry which shows steady progress. For the reasons for this steady increase, Mr. H. D. Madden, Engineer and Manager to the Cardiff Gas Light and Coke Company, is quoted, writing in the "Western Mail" Engineering Supplement on Nov. 12: "An abundant supply of cheap and efficient heat is a greater necessity to the British manufacturer than even cheap power." It is because the gas industry is supplying this heat to British industrialists that it is making such marked progress.

NEW DEVELOPMENTS.

Each year, continues the article, gas undertakings find new fields which can be developed, and among these is central heating by gas.

It is suggested that possibly the most outstanding development in the gas industry during the past year has been the increase in the use of gas for water heating. Gas has long been acknowledged as an ideal fuel for water heating, but it is sometimes regarded as rather a luxury for householders with moderate-sized purses. The thermal storage gas water heater which has recently been placed on the market has brought down the cost of domestic water heating to a figure which can be afforded by almost everyone.

Porthcawl Works to be Renovated.

A special meeting of the Porthcawl Council was held on Dec. 29 to decide the future of the gas-works. It was explained that the Council's original intention was to scrap the gas-works and erect a new one on a new site, but that had been ruled out on the ground of expense. They had decided to renovate the present gas-works and to install vertical retorts. The Ministry had told them they could not grant the necessary loan for a new works, and they were adopting the next best thing. The tenders for vertical retorts were £8566, £10,375, and £11,500. The Chairman (Mr. Evan J. Lewis) said it was estimated that gas would be reduced in price as the result of the improvements which they proposed carrying out.

It was decided that the three members of the Council and the Engineer and Manager (Mr. S. Walker) should visit various plants, and that plenary powers be given to the Committee in the matter.

Another Amalgamation in the London Area.

The Directors of the Sutton Gas Company have unanimously resolved to enter into a provisional agreement for the amalgamation of the Company with the Wandsworth, Wimbledon, and Epsom District Gas Company.

The terms of the agreement include:

The issue of £165 5 p.ct. preference stock of the Wandsworth, Wimbledon, and Epsom District Gas Company for each £100 ordinary stock of the Sutton Company.

The issue of £100 5 p.ct. debenture stock of the Wandsworth, Wimbledon, and Epsom District Gas Company for each £100 debenture stock of the Sutton Gas Company.

A reduction in the price of gas to consumers in the Sutton Company's area.

Provisions for compensation to Directors, Auditors, and Staff, and favourable provisions with respect to employees.

The agreement is subject to the approval of the proprietors of both Companies and to a Special Order being made by the Board of Trade confirming the terms of the agreement. The Wandsworth, Wimbledon, and Epsom District Gas Company will apply for the Order.

Third International Conference on Bituminous Coal.

A third international conference on bituminous coal will be held at the Carnegie Institute of Technology in Pittsburgh, Pa., in November, 1931, according to a recent announcement of Dr. Thomas S. Baker, President of the Institute of Technology and organizer of the first two congresses.

Prominent fuel technologists from all parts of the world will be invited to attend the conference. In connection with the organization of the meeting, Dr. Baker will make a trip to Europe this month to invite prominent scientists to speak at the congress. He will visit Paris first for a period of several weeks, going from there to London, Berlin, and other European capitals. He will remain abroad until the middle of February. The purpose of the conference, Dr. Baker announced, will be similar to that of the meetings held in 1926 and 1928—to present for discussion the results of recent studies in coal.

The programme will include papers on carbonization, liquefaction, and gasification of coal; bye-products of coal; the mechanism of combustion; cleaning of coal and its preparation for the market; pulverized fuels; power plants; and domestic heating.

Announcement of this third world meeting comes in logical sequence to the previous congresses. The first conference was organized by President Baker in 1926 for the purpose of finding new uses for bituminous coal. This meeting, although the first of its kind to be held, attracted 1700 scientists from thirteen

countries. Two years later followed the second congress which was broader in its scope, including discussions on pulverized fuel, low-temperature carbonization of coal, rubber from coal, the hydrogenation of coal, and bye-product nitrogen. Speakers during the two conferences have included such scientists as Georges Claude, Dr. Friedrich Bergius, Prof. Franz Fischer, Dr. C. H. Lander, Dr. R. Lessing, General Georges Patart, Dr. Fritz Hofmann, and Dr. Karl Krauch. Papers of numerous other fuel technologists were presented at the meetings.

The published proceedings of the two conferences have been enthusiastically received, and they are now considered standard reference books on modern fuel technology.

Colonial Gas Association Limited.

Forty-Second Annual Meeting.

The forty-second annual general meeting of the members of the Colonial Gas Association Limited was held in the Board Room, 377, Little Collins Street, Melbourne, on Wednesday, Oct. 8, 1930—Mr. P. C. Holmes Hunt, M.Inst.C.E., Chairman of Directors, presiding.

Mr. R. C. Shaw, the Secretary, read the notice convening the meeting, and it was resolved that the Directors' report and balance-sheet be taken as read.

The Chairman, in moving the adoption of the report, said that the sales of gas for the Association's Works show an increase of 2·8 p.ct. over the preceding year, and the sales by the Subsidiary Companies 3·7 p.ct., and these comparatively low increases have been principally due to the falling-off in consumption since January last. Nothwithstanding the transfer of £9430 from the reserve fund to the credit of the coal account, the cost of coal and purifying materials is £13,704 more than the previous year. Wages, repairs, maintenance, and depreciation have increased by £6699, the bulk of which is in wages, and is largely accounted for by the labour required to handle the extra tonnage of coal. The revenue from the sales of gas is higher by £14,248. The net result of the revenue account is that the gross profits have increased by £8608.

Bank interest is lower by the sum of £586, but debenture interest has increased by £7968, the net increase in interest paid being £7382. The net increase in capital expenditure is £31,839, the principal item being the erection at Box Hill Works of the 300,000 c.ft. spiral-guided gasholder, and of additional retort settings.

Due to a very large extent to the inferior coals which were carbonized during the year, the returns from bye-products have not been as good as previously.

Sir Arthur Robinson seconded the resolution, which was carried unanimously.

The Chairman then moved

(*a*) That a dividend at the rate of 8 p.ct. per annum (*less* interim dividend of 4 p.ct. for the half-year ended Dec. 31, 1929) be paid on the preference shares; and

(*b*) That a dividend at the rate of 8 p.ct. per annum (*less* interim dividend of 4½ p.ct. for the half-year ended Dec. 31, 1929) be paid on the ordinary shares; and

(*c*) That £8000 be set aside for Australian income-taxes on profits earned to June 30, 1930; and

(*d*) That the balance, approximately £19,114, be carried forward to the next account.

Sir Arthur Robinson seconded the resolution, which was carried unanimously.

The Chairman next moved: That the meeting sanction an increase of the capital of the Company by the creation of 45,000 additional 8 p.ct. preference shares of £1 each and 40,000 additional ordinary shares of £1 each.

The resolution was carried unanimously.

Long Distance Gas Transmission in Germany.

In the course of an article appearing in "The Times Trade and Engineering Supplement" of Dec. 13, it was stated that during the past 13 months there have been erected at Magdeburg very large gas-works, which, equipped with every possible labour-saving contrivance, are destined to supply a large section of central Germany with what is known as Fern-Gas. The works are situated actually a short distance outside Magdeburg—namely, at Rothensee—where the great Mittel-Land Canal from the Ruhr coalfields will one day join the Elbe, and they are designed to deal with 1000 tons of coal daily.

Although Magdeburg is within easy reach of vast deposits of soft brown coal the works are planned to use hard coal, for the engineers have not yet succeeded in perfecting a process by which gas for heating and lighting on a large scale can be obtained profitably from lignite. It is no doubt intended that the requisite coal shall be brought ultimately from the Ruhr district, but for the present the curious situation presents itself that this ambitious enterprise in the heart of Germany is working with British coal.

Every modern appliance for dealing with the coal arriving by rail or by water (the Elbe) is in use, the incoming supplies being rapidly conveyed to a tower capable of holding about 3000 tons, from which the sixty ovens are automatically fed. Storage places for 60,000 tons of coal have been constructed near the canal.

Pipelines have been laid to the outskirts of Leipzig, passing through such important places as Zerbst and Dessau, and near the manufacturing district of Bitterfeld, also westwards from Dessau through the Harz region to Ilsenburg. As soon as possible another main line of pipes will be taken northwards to Wittenberge, and as time goes on branches from these main pipelines will bring the gas, for industrial and domestic purposes, to hundreds of other towns and villages.

The local gas-works are to be retained for the present until further experience with the Fern-Gas system has been gained, but the administration of the new works announces that 90 p.ct. of their output has already been sold to communes and district councils. One gasholder, with a capacity of 100,000 cub.m., and a reservoir for 3500 tons of tar, are already in operation. The gas is forced into the long-distance pipes at Magdeburg under a pressure of 10 atmospheres, and it has been calculated that when it reaches the end of the line, at Leipzig, the pressure will be three atmospheres. The enterprise is owned by the city of Magdeburg as to 51 p.ct., and by the Kontinentale Gas Gesellschaft of Dessau as to 49 p.ct.

The Scope of Woodall-Duckham Work in 1930.

During 1930 the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., and their foreign Associates have received orders for Woodall-Duckham carbonizing plant of a total annual capacity of over 610,000 tons of coal, to be built in various parts of the world. In addition the Woodall-Duckham Company have secured orders for Becker coke ovens to carbonize nearly 640,000 tons of coal a year.

A feature of the year's work has been the continued success of the 103 in. type of Woodall-Duckham continuous vertical retort. An installation of 28 of these retorts recently put to work at Aberdeen gives a gas output of 100,000 c.ft. per foot run of bench. Orders for 103 in. retorts received in 1930 are:

Edinburgh	44 retorts
Bordeaux	12 ,,
Valencia	10 ,,

Five plants of this type are now either working or building in Great Britain, two in France, two in Italy, one in Spain, and one in Japan. The total annual capacity of these installations will be nearly 1,340,000 tons of coal.

Several orders have also been received for other types of Woodall-Duckham continuous retorts. In the 80 in. type eight retorts are ordered for Brighton (Australia). Three 62 in. installations have been booked for Newcastle-under-Lyme (6 retorts), Castres (France) 8 retorts, and Deal (an extension of 6 retorts). 53 in. installations are building at Skegness (an extension of 6 retorts), Elgin (6 retorts), Saltcoats (4 retorts), and Launceston (Tasmania) 4 retorts, while an installation of 6 retorts ordered at the beginning of the year for Ascot is now in operation. In addition three 44 in. retorts were ordered for Newquay and three for Monmouth.

Two important installations of Woodall-Duckham intermittent vertical chambers were ordered during the year—one for the Gas Light and Coke Company's Southall Works, consisting of a further 48 chambers, and one of 24 chambers for Southampton.

An extension of nine Woodall-Duckham inclined chamber ovens has been ordered for Lancaster.

Two large orders for Becker coke ovens, complete with bye-product recovery and coke handling plant, have been received—one for Messrs. John Lysaght, Ltd., to be erected at Scunthorpe, and one, secured against world-wide competition, from the South African Iron and Steel Industrial Corporation, Ltd., to be erected at their new works at Pretoria.

In addition to coal carbonizing plant, the Woodall-Duckham Company have received a number of orders for other types of plant.

A large Woodall-Duckham refuse incineration plant capable of burning 333 tons of London refuse in 16 hours has been ordered by the Ford Motor Company, Ltd., to raise steam for the power house at their Dagenham Works.

Woodall-Duckham circular tunnel kilns for pottery ware have been ordered by Messrs. W. R. Pickup, Ltd., Horwich, and by the Farnley Iron Company.

The Nottingham Gas Department have ordered a coke screening and storage plant.

Waste heat recovery is an important part of Woodall-Duckham work, and, in 1930, 16 waste-heat boilers have been ordered with an aggregate output of over 102,500 lbs. of steam per hour. Thirteen of these are included with carbonizing plants mentioned above, and the other three were ordered for Wallasey, Margate, and Silsden.

"T.I.C." tar treatment plants have been ordered for Newmarket, Dunoon, Lincoln, Hereford, and Montbeliard (France).

INSTITUTION OF GAS ENGINEERS

RESULTS OF 1930 EXAMINATIONS.

The undermentioned Candidates were successful in the 1930 Examinations of the Institution of Gas Engineers in Gas Engineering and Gas Supply, held under the revised Regulations of the Education Scheme as approved by the Council of the Institution of Gas Engineers, the Government Education Departments of Great Britain and Ireland, and the City and Guilds of London Institute. The results do not include candidates who withdrew before the Examination, or who, having Second Class Certificates, re-sat and failed to secure a First Class Certificate, or whose Examination has not been completed.

Results of Examinations.

—	1929.					1930.				
	First Class.		Second Class.	Failed.	Total Sat.	First Class.		Second Class.	Failed.	Total Sat.
	Distinction	—				Distinction	—			
External—										
Diploma in Engineering	..	4	2	7	13	..	1	2	1	4
H.G. Engineering	..	6	11	13	30	..	9	6	5	20
O.G. Engineering	..	8	16	1	25	..	3	12	3	18
O.G. Engineering (single subject)	..	3	6	1	10	..	..	..	..	..
Diploma in Supply	..	..	..	..	*Nil*	..	..	..	..	*Nil*
H.G. Supply	..	..	2	..	2	..	2	..	..	2
O.G. Supply	2	23	7	1	33	1	8	9	4	22
O.G. Supply (single subject)	1	11	..	..	12	..	4	..	..	4
Internal—										
H.G. Engineering	1	4	13	23	41	..	10	32	13	55
O.G. Engineering	5	21	17	16	59	5	13	22	16	56
O.G. Engineering (single subject)	..	..	..	..	..	..	1	..	..	1
H.G. Supply	..	2	10	8	20	2	9	8	5	24
O.G. Supply	3	25	24	12	64	10	27	28	7	72
O.G. Supply (single subject)	..	..	..	..	..	1	7	1	..	9

EXTERNAL CANDIDATES.

Diploma in Gas Engineering (3).

Class.	Name.	Town.	Subject of Thesis.
First	McGown, Sam*	Glasgow.	"The Utilization of a Low-Grade Gas."
Second	Greaves, R. L.	Shrewsbury.	"The Partial Dehydration of Town Gas."
,,	Ward, D. J.	Birmingham	"Leaks in Vertical Retorts — Their Treatment by Hot Patching."

* Awarded the Charles Hunt Memorial Medal in Gas Engineering.

Higher Grade Certificate in Gas Engineering (15).

Class.	Name.	Town.
First	Brush, A. S.	Silloth
,,	Cooper, J. E.	Cleethorpes
,,	Davison, H. G.	Chester
,,	Duncan, T. M.	Perth
,,	Fairbank, W.	Morecambe
,,	Garner, L. F.	Luton
,,	Harrison, W. B.	Blackburn
,,	Staniforth, C. B.	Great Yarmouth
,,	Tiddy, K. E.	Hinckley
Second	Booth, F. N.	Rochdale
,,	Fawkes, S. V.	Stroud
,,	Johnston, W. S.	Dundee
,,	Madden, T. H.	Cardiff
,,	Marshall, J. S.	Preston
,,	Maycock, H.	Sittingbourne

Ordinary Grade Certificate in Gas Engineering (15).

Class.	Name.	Town.
First	Corrin, C. R.	Isle of Man
,,	Firth, H.	Halifax
,,	Ramsden, H.	,,
Second	Atkinson, T. H.	Sowerby Bridge
,,	Canning, T. H.	Southend-on-Sea
,,	Clibbens, D. C.	Bristol
,,	Croad, G.	Hebden Bridge
,,	Ellacott, T. C.	Bishop Auckland
,,	Fillery, E. J.	Southend-on-Sea
,,	Howells, A. D.	Briton Ferry
,,	New, W.	Plymouth
,,	Peel, A. E.	Stockton-on-Tees
,,	Royston, J.	Kildwick
,,	Warman, C. R.	Bradford
,,	Warrilow, J. S.	Stoke-on-Trent

Diploma in Gas Supply (Nil).

Higher Grade Certificate in Gas Supply (2).

Class.	Name.	Town.
First	Brown, K. E. B.	Morecambe
,,	Sullivan, H. B.	Lancaster

Ordinary Grade Certificate in Gas Supply (18).

Class.	Name.	Town.
First	Bichard, C. T.	Guernsey
,,	Brandram, A. J.*	Portsmouth
,,	Lawson, T. W.	Seaham Harbour
,,	Millican, A. J.	Sunderland
,,	Petersen, C. F.	East Grinstead
,,	Pope, J. G.	Workington
,,	Pye, J. W.	Plymouth
,,	Wilkinson, C.	Burnley
,,	Williamson, R.	Sunderland
Second	Chilcott, J. A.	Swansea
,,	Dann, A. F.	Bedford
,,	Deans, T. G.	Sunderland
,,	Goldthorpe, E. T.	Farnham
,,	Jones, L. D. R. L.	Burnley
,,	Lewis, J. L.	Stoke-on-Trent
,,	Porter, W. H. B.	South Shields
,,	Rumble, D. L.	Reading
,,	Warman, C. R.	Bradford

* = With Distinction.

Ordinary Grade (Single Subject) Examination in Gas Supply to qualify to sit for the Diploma Examination in Gas Engineering (4).

Class.	Name.	Town.
First	Lowe, F.	Ramsgate
,,	Mead, K. C.	Beckton
,,	Rogers, C. W. M.	,,
,,	Ryder, E. A.	London

INTERNAL CANDIDATES.

Higher Grade Certificate in Gas Engineering (42).

Class.	Name.	Centre.
First	Ashman, W. L.	Bath
,,	Baird, W. N.	Edinburgh
,,	Daniels, J. H.	Manchester
,,	Hart, E. H.	Regent Street Polytechnic
,,	Kirkwood, W. O.	Newcastle
,,	Pinder, A. H.	Blackburn
,,	Rea, A. C.	Edinburgh
,,	Summerson, J.	Regent Street Polytechnic
,,	Symon, F. G.	Glasgow
,,	Turner, C. R. E	Birmingham
Second	Bell, F.*	Leeds
,,	Borrett, V. J.	Bath
,,	Cruise, A. J.	Cardiff
,,	De Gruchy, R.	Regent Street Polytechnic
,,	Foulds, R. W.	Liverpool
,,	Gibson, J. M.	Manchester
,,	Gilden, G.	Salford
,,	Gledhill, W. M.	Manchester
,,	Graham, K. S.	Glasgow
,,	Grounds, F. W.	Manchester
,,	Henderson, W.	Newcastle
,,	Law, J.	Regent Street Polytechnic
,,	MacGregor, K. M.	Manchester
,,	Mead, K. C.	Regent Street Polytechnic
,,	Mogford, G. A.	Cardiff
,,	Neil, G.	Newcastle
,,	Oldham, W.	Liverpool
,,	Ramage, W.	Edinburgh
,,	Reed, C. A. E.	Newcastle
,,	Richardson, J.	,,
,,	Scott, S.	,,
,,	Shackleton, H.	Burnley
,,	Storrier, J.	Dundee
,,	Stothart, J. D.	Regent Street Polytechnic
,,	Sumner, P.	Salford
,,	Thompson, D. M.	Manchester
,,	Tildesley, W. R. D.	Birmingham
,,	Truslove, C. J. F.	,,
,,	Underhill, C. H.	,,
,,	Ward, G. A.	Huddersfield
,,	Williams, H. V.	Cardiff
,,	Windiate, G. H. F.	Manchester

* Corbet Woodall Scholar at Leeds University, 1930 31.

Ordinary Grade Certificate in Gas Engineering (40).

Class.	Name.	Centre.
First	Aird, A.	Glasgow
,,	Banner, G. E.*	Birmingham
,,	Bland, R. W.	Bradford
,,	Brockbank, S.*	Birmingham
,,	Claydon, J. A.	,,
,,	Crawford, J. O.*	Glasgow
,,	Davison, R. P.	Newcastle
,,	Dickenson, A. W.	Regent Street Polytechnic
,,	Field, E. B.*	Blackburn
,,	Gould, A. K.	Bradford
,,	Hawkins, B. G. H. J.	Plymouth
,,	Murray, G. F. J.	,,
,,	Partington, H.	Manchester
,,	Pearce, K. L.	Birmingham
,,	Waller, F. B.	Edinburgh
,,	Ward, H. A *	Birmingham
,,	Westwood, R. A.	,,
,,	White, T. L. N.	Cardiff
Second	Bell, D. S.	Manchester
,,	Burton, P. F.	Glasgow
,,	Castle, J.	Bradford
,,	Clough, J.	Burnley
,,	Day, J.	Regent Street Polytechnic
,,	Donnelly, R.	,, ,, ,,
,,	Eccleshare, K. G.	Derby
,,	Facer, A.	Manchester
,,	Farnworth, E. N.	Blackburn
,,	Horner, A. S.	Liverpool
,,	Kerley, G.	Regent Street Polytechnic
,,	King, F. H.	Manchester
,,	Mills, J. E.	,,
,,	Morton, N.	,,
,,	Price, P. H. J.	Cardiff
,,	Reed, E. V.	Newcastle
,,	Royall, E. C.	Birmingham
,,	Sanders, M. J.	Plymouth
,,	Vane, S.	Regent Street Polytechnic
,,	White, W. H.	,, ,, ,,
,,	Wilkinson, C.	Burnley
,,	Woodhead, C. A. B.	Liverpool

* = With Distinction.

Ordinary Grade (Single Subject) Examination in Gas Engineering to qualify to sit for the Diploma Examination in Gas Supply (1).

Class.	Name.	Centre.
First	Randall, L. F.	Westminster

Higher Grade Certificate in Gas Supply (19).

Class.	Name.	Centre.
First	Baird, W. N.	Edinburgh
,,	Castell, A. H.	Westminster
,,	Davies, D. J.	,,
,,	Hall, J. S.	,,
,,	Hilliard, R. M.	,,
,,	Madge, G. H. W.	,,
,,	Mitchell, J.	,,
,,	Phillips, A. G.	,,
,,	Price, J.	,,
,,	Scott, N. G.*	,,
,,	Willsmer, R. J.*	,,
Second	Grant, F. A.	Birmingham
,,	King, H. J.	,,
,,	Lane, W. T.	Cardiff
,,	MacKenzie, R.	Birmingham
,,	Maskell, N. P.	,,
,,	Tapper, M. H.	Westminster
,,	Toop, A. J.	,,
,,	Weichardt, P. R.	,,

* = With Distinction.

Ordinary Grade Certificate in Gas Supply (65).

Class.	Name.	Centre.
First	Aird, A.*	Glasgow
,,	Brown, C. H.	Westminster
,,	Brunton, S.*	,,
,,	Burton, P. F.*	Glasgow
,,	Carlisle, H. T.	Westminster
,,	Cocks, K.	Tottenham
,,	Cooke, H. R.	Westminster
,,	Crocker, H. S.	Tottenham
,,	Dickson, D. L.*	Glasgow
,,	Goldsmith, J. J.	Westminster
,,	Grammer, J. M.	,,
,,	Hand, R. M.	East Ham
,,	Hanlan, W.	Westminster
,,	Keir, D. I.	Birmingham
,,	Kennedy-Wilson, E. L. K.	Westminster
,,	Kibblewhite, L. C.	,,
,,	King, S. A.*	Tottenham
,,	March, W. L. H.	Westminster
,,	Mayo, A. F.*	,,
,,	Palmer, S. F.	,,
,,	Pegg, E. E.	,,
,,	Pritchard, W. F.	Tottenham
,,	Pugh, J. E.	Westminster
,,	Rea, A. C.*	Edinburgh
,,	Read, F. J. N.*	Huddersfield
,,	Salter, F.	Westminster
,,	Sheldrake, T. W. S.*	,,
,,	Skilton, H. C. S.	East Ham
,,	Stewart, W. A. M.*	Glasgow
,,	Swann, A. J.	East Ham
,,	Thompson, A. J.	,,
,,	Turner, J. G.	Liverpool
,,	Wakefield, E. M.	Westminster
,,	Westbrook, G. A.	,,
,,	Westerland, R.	,,
,,	White, A. H.	Tottenham
,,	Woplin, S. H.	East Ham
Second	Barratt, G.	Tottenham
,,	Bell, H. S.	Westminster
,,	Boothroyd, R.	Huddersfield
,,	Brown, R. R.	Cardiff
,,	Burkett, F. R.	Westminster
,,	Clarke, W. G.	,,
,,	Cox, M. J.	,,
,,	Cross, G. A.	,,
,,	Crouch, F. M.	Tottenham
,,	Dean, J.	Hull
,,	Dolton, C. D.	Westminster
,,	Foster, E. G.	East Ham
,,	Funk, J. E.	Liverpool
,,	Gardiner, A.	Manchester
,,	Henderson, D. C.	Dnudee
,,	Howes, W. J.	Tottenham
,,	Hutton, J. A. D.	Westminster
,,	King, N. P.	,,
,,	Livett, A. E.	,,
,,	Markham, E.	East Ham
,,	Reeve, C. G.	Westminster
,,	Ruddock, H. E.	,,
,,	Saunders, W. C.	,,
,,	Shelvey, J.	Tottenham
,,	Smith, R.	Hull
,,	Tipton, A. H.	Birmingham
,,	Triggs, W. A.	East Ham
,,	Tully, H. A.	Westminster

* = With Distinction.

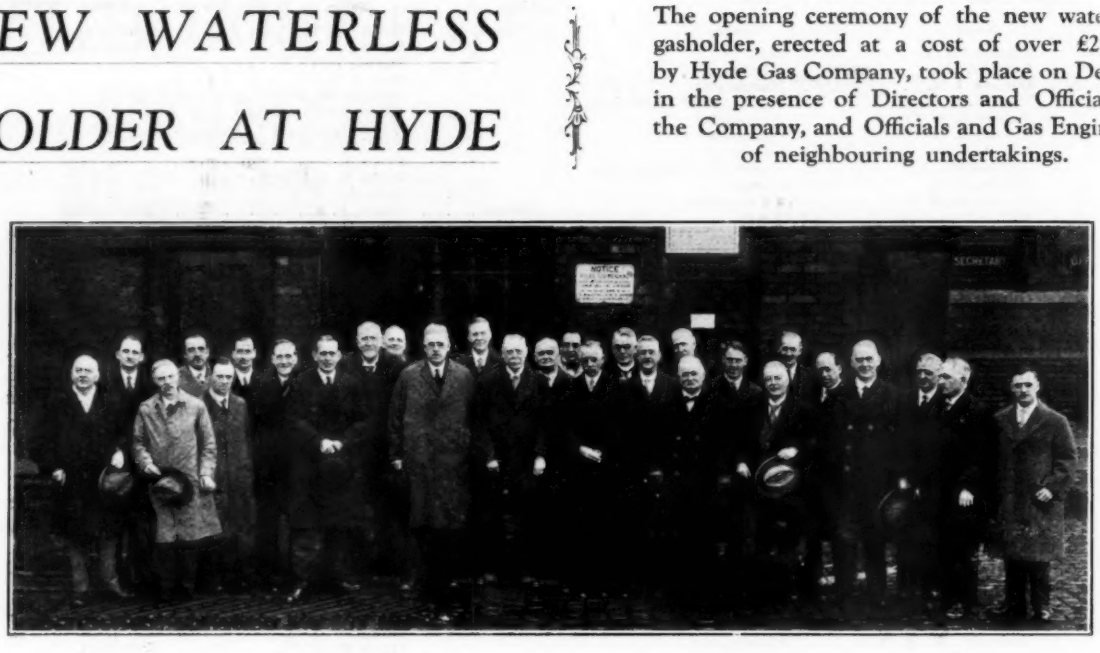
Ordinary Grade (Single Subject) Examination in Gas Supply to qualify to sit for the Diploma Examination in Gas Engineering (8).

Class.	Name.	Centre.
First	Baker, R.	Westminster
,,	Derbyshire, J. A.	Blackburn
,,	Farnworth, E. N.	,,
,,	Field, E. B.*	,,
,,	Harrison, A.	,,
,,	Hayes, R.	,,
,,	Hendy, R.	Westminster
,,	Risby, J.	,,

* = With Distinction.

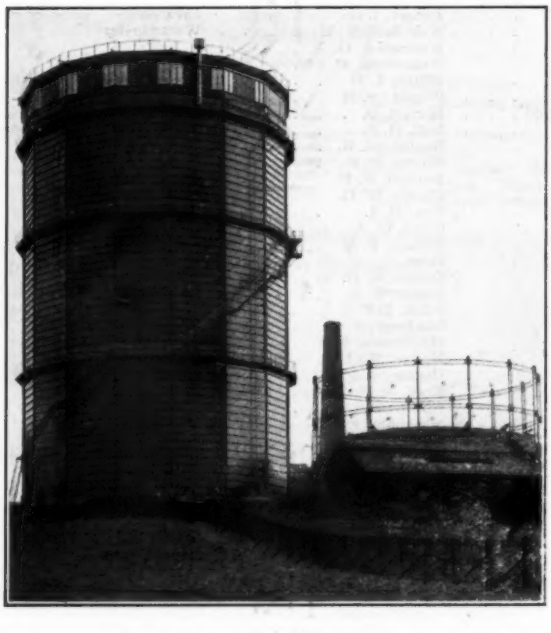
NEW WATERLESS HOLDER AT HYDE

The opening ceremony of the new waterless gasholder, erected at a cost of over £20,000 by Hyde Gas Company, took place on Dec. 29 in the presence of Directors and Officials of the Company, and Officials and Gas Engineers of neighbouring undertakings.



In performing the opening ceremony, by turning on the main valve which gave a supply to the public from the new holder, Mr. G. F. Drinkwater, C.A., J.P., Chairman of the Company, said the holder had been erected to meet the growing demand for gas in the district, and he had every confidence that the completed work would be a credit to the constructors and all concerned.

Mr. J. Brabbs, Engineer and Manager, pointed out that the new holder has a working capacity of 1 million c.ft., and it is approximately 100 ft. in diameter by 153 ft. high, having 54 tiers of side plates. The Board of Directors, he explained, were compelled by the following facts to increase the gas storage capacity: The guide-framed holder, which has a capacity of ¾ million c.ft., began in 1925 to give serious trouble, and early in 1926 the crown of the holder collapsed. A new inner lift was provided, and the holder worked until 1928, when more trouble was experienced. After careful investigations, it was found that on one side there had been subsidence, due to running sand and water. Efforts were made to grapple with the problem by piling along this defective side. To avoid any danger or risk, this holder was now working only to a maximum of 400,000 c.ft.



The troubles, however, were not over, as owing to its dangerous condition it was necessary to take out entirely an old holder, which was situated in the yard and had a capacity of 230,000 c.ft. For many years it had only been possible to utilize this up to a capacity of 90,000 c.ft. The tank of this holder was converted into a tar and liquor well.

"We were thus faced," continued Mr. Brabbs, "with a storage capacity of about 850,000 c.ft., while our maximum 24 hours' output had been 1,270,000 c.ft—a shortage of 420,000 c.ft. Thanks are due to my Directors for tackling the problem so promptly. They visited several works to investigate the merits or demerits of the waterless holder, and it was decided to ask for tenders for the latter type. Messrs. R. & J. Dempster, Ltd., secured the contract, and we have every reason to be satisfied with the work they have done. The holder is designed and weighted to give a pressure of 9 in. The design and flexibility of the seal are too well recognized to require much comment, but I would like to say that the seal has given every satisfaction, and there has not been a leak at any joint or rivet of the structure. The workmanship throughout has been excellent, and the job carried through without any serious mishap or accident. A special feature of the installation is the self-contained electric generating plant for the necessary current for the pumps and lighting. This power is obtained by a "National" gas engine, and service and storage batteries for 48 hours' working have been provided to prevent any unnecessary labour during the night time and week-ends. Since the holder was set to work on Nov. 17 last, the total number of pump runs has only been 115 in 35 days. A run is approximately of four minutes' duration; and I would emphasize that, although there are four pumps in duplicate, it has only averaged 0·41 pump runs for each of the eight pumps per day. This has been to me, as Engineer, a very welcome surprise; and we have had fitted an ammeter, so that eventually we shall be able to state definitely the actual cost of running over a period of twelve months."

Luncheon.

Afterwards, at the invitation of Messrs. R. & J. Dempster, Ltd., the contractors, the company of thirty assembled at luncheon at the Queen's Hotel. After dinner, Mr. C. Dempster, Chairman of Messrs. R. & J. Dempster, Ltd., who presided, gave the Loyal Toast.

Mr. Drinkwater, in proposing the toast of "The New Holder and Its Contractors," said that the firm of R. & J. Dempster, Ltd., had stood honourably and prominently in the gas industry for over 50 years as manufacturers of all kinds of gas plant. Messrs. Dempster were also the pioneers of the spiral-guided holder; and the firm had the distinction of erecting the largest spiral-guided holder in the world, which had a capacity of 7 million c.ft. Every credit must be given by the gas industry to the firm for the manner in which they investigated and tackled the question of the waterless holder. In August, 1929, the concrete foundations were commenced for the Hyde holder, and the job was finished and the holder working by the beginning of November last.

"It is a fact," continued Mr. Drinkwater, "that there is still hostile criticism about this kind of holder, chiefly on account of its appearance; but I venture to say that in my opinion it compares more

than favourably with our other holders. I should like to congratulate Messrs. Dempster on the manner in which the work has been executed. I am told that the number of waterless holders in actual use or being erected in this country is 26. May I at this point say how much my Board appreciated the kindness and courtesy extended to them by Mr. Hardie and his Engineers, of the Gas Light and Coke Company, London, and also Mr. Frank Prentice, Engineer of the Ipswich Gas Company, on the occasion of our visits, and are deeply grateful for the information placed at our disposal."

Mr. C. DEMPSTER, in responding, said his firm had always tried to keep abreast of progress in the gas industry, and hoped to continue to do so. The waterless holder they had opened that day was the latest type working successfully. That type was started about 1914, and with one exception had worked successfully ever since. They could not have a better holder, particularly in certain districts such as mining districts and where they had bad foundations. If they did get a subsidence through colliery workings or other causes, it was comparatively simple to put the holder straight again. They could not do that with a water-sealed holder. Another advantage was that, in view of the possibility that in the near future Government regulations would require the inspection of all holders, it was necessary that there should be easy access. In conclusion, he presented Mr. Drinkwater with a handsome mahogany smokers' cabinet, containing cigars and cigarettes, as a souvenir of the occasion.

In acknowledging the gift, Mr. DRINKWATER said he would treasure the cabinet, and would always remember the pleasant business associations the Company had had with Messrs. Dempster; he hoped the good relationship would continue for many years.

Mr. J. W. SCOTT, Managing Director of Messrs. Dempster, described the history of the introduction of the waterless gasholder, which was originally devised and constructed in Germany. His firm, who were the pioneers of the spiral holder, instructed him to investigate waterless gasholders on the Continent; and he went to Germany, where he came into contact with Dr. Jackets, and obtained copies of the drawings of the waterless type of holder which he recommended his firm to adopt. Fortunately, they had not had occasion to regret the outlay entailed in the production of the waterless holder; and they had been able to find a great amount of work for British roller mills, British electricians, and British working men at their works at Newton Heath.

Mr. P. HIBBERT, Vice-Chairman of the Hyde Gas Company, proposed the health of "The Visitors."

Mr. W. I. SHERRY, Director, in seconding, said he believed Messrs. Dempster had made a very good job of the new holder. The gas industry, he went on, seemed to flourish on opposition. Since electricity came into prominence the Hyde Gas Company had doubled their output; and other undertakings had done the same thing. Gas was more economical than electricity for street lighting. For some years he had been Deputy Chairman of the Lighting Committee at Colwyn Bay, where they had their own gas and electricity. In Colwyn Bay 15 p.ct. of the lighting was done by electricity and 85 p.ct. by gas; and the 15 p.ct. electricity consumption was costing more than the 85 p.ct. done by gas. Regarding the lighting at Hyde, if the Hyde Corporation had spent one-twentieth part in improving their apparatus for gas lighting that they had spent on electricity, there would have been a far different tale to tell, and they would have had a far better lighted town to-day. If they would give the Gas Company a fair chance by providing proper apparatus the Gas Company would be able to give a far better light in Hyde and at much less expense.

Sir THOMAS ROWBOTHAM, Chairman of the Stockport Corporation Gas Committee, in response, said that Stockport were following Hyde's example in erecting a waterless holder three times as big as the one at Hyde.

Alderman J. W. UNDERWOOD, Chairman of the Dukinfield Gas Committee, also responded.

Mr. J. SMITH, of Colwyn Bay, gave his experiences of investigations of waterless holders in Germany. Colwyn Bay would probably have been the pioneers of this holder if they could have had them of British manufacture; but he was proud to think that since then British manufacture had risen to the occasion. He thought the waterless gasholder possessed all the advantages which had been claimed for it. In his position he had charge of both gas and electricity undertakings; and he thought the time had come when it was essential that public utility undertakings should be under one administrative authority, and that purveyors of public utility commodities should be in a position to state what was best and most economical from both national and local standpoints.

Mr. J. W. SCOTT expressed, on behalf of the contractors, high appreciation of the assistance rendered by the officials of the Hyde Gas Company, especially Mr. John Brabbs and his Assistant, Mr. G. D. Duthie.

Mr. BRABBS thanked them for their appreciative remarks, and in turn expressed his appreciation to the Directors for their help and encouragement.

Review of Statute and Case Law of 1930,

as applicable to Gas Undertakings.

Notwithstanding that the Companies Act, and Gas Undertakings Act of 1929 have been in operation during the past twelve months, comparatively few cases of great importance have reached the Courts, but the following notes will indicate the increasing number of Acts and cases which directly or indirectly affect our readers.

STATUTES OF 1930.

Finance Act.—A summary of the provisions of this Act appeared on p. 366 of the "JOURNAL" for Aug. 13. The following sections are to be noted in particular: Section 8 (increase in rate of income-tax), 12 (deduction of tax from dividends), 14 and 15 (amendment in mode of assessment), 19 (extension of relief in respect of contributions to superannuation funds), 23 power of Special Commissioners to obtain copies of registers of securities), 24 (collection of tax notwithstanding appeal against assessment), 27-29 (schedule A re-valuations), 41 (amended provisions relating to relief from Stamp Duty on amalgamation of companies).

Coal Mines Act.—A synopsis of the provisions of this Act appeared on p. 468 of the "JOURNAL" for Aug. 27. Section 4 provides for contracts for the supply and sale of coal which have been made before the passing of the Act, and also in respect of contracts entered into subsequently.

Public Works Facilities Act.—The expressed intention of this Act is to expedite the procedure for empowering local authorities and statutory undertakers to execute works which will contribute to the relief of unemployment—by means of schemes submitted to the appropriate Minister for approval and submission to Parliament for confirmation (section 1). The Act also seeks to facilitate the acquisition of land, &c., by local authorities and statutory undertakers.

Public Works Loans Act.—An Act to grant money for the purpose of certain Local Loans out of the Local Loans Fund, and for other purposes relating to Local Loans.

Road Traffic Act.—Section 4 (1) enacts that ". . . a person shall not employ any person to drive a motor vehicle on a road unless the person so employed is the holder of a licence . . .," while section 35 provides penalties for using a motor vehicle on a road unless a third-party insurance policy is in force.

Expiring Laws Continuance Act.—The Bill as originally drafted provided for the continued operation of legislation affecting miners' wages, rent restrictions, and other statutes, which would otherwise expire on Dec. 31, 1930, but owing to the action of the House of Lords and the narrow majority in the House of Commons for the passing of the Bill as it stood, the Dyestuffs (Import Regulation) Act, 1924, was included in the provisions. Protection is thus assured for another twelve months, until Dec. 31, 1931, for a great industry which depends largely on the carbonization of coal in gas-works for the foundation of dyes and chemicals.

CASE LAW OF 1930.

INCOME-TAX.

It was held that no "succession," for the purposes of assessment to income-tax, to the business carried on hitherto by a bankrupt firm had taken place in circumtances where certain assets only were acquired, and the stock-in-trade, book debts, and trade liabilities were not also taken over. (*Reynolds, Sons, & Co., Ltd., v. Ogston,* Court of Appeal, Feb. 5, 1930.)

The receipt of periodical sums under the provisions of the Trade Facilities Act, 1921, calculated in a manner approved by the Unemployment Grants Committee for the purpose of meeting certain capital expenditure, is not income of the undertaking involving liability to tax. (*Seaham Harbour Dock Company v. Crook,* Court of Appeal, Oct. 27, 1930.)

Where a company, having no profits assessable to tax in a particular year, paid interest on debenture stock out of a reserve fund (which had been accumulated in past years out of taxed profits), it was decided that, by reason of there having been no assessment *for that year,* the company had no right to retain the income-tax deducted on paying such interest; the amount so deducted must be accounted for to the Inland Revenue. (*Luipaard's Vlei Estate and Gold Mining Company v. Commissioners of Inland Revenue,* Court of Appeal, Feb. 5, 1930.)

The provisions of the Companies Act, 1929, whereby all taxes assessed up to April 5 preceding the date of liquidation of a company or of a receiver being appointed and taking

possession, is entitled to priority of payment in a winding-up (with the proviso that the prior claim is not to exceed, in the whole, one year's assessment) have been held to include all taxes assessed to that date irrespective of the fact that the actual assessment may have been made before or subsequent to that date. (*Gowers and Others v. Walker and Others*, Chancery Division of the High Court, Dec. 19, 1929.)

A sum received as damages for failure to complete repairs within the stipulated period has been regarded by the Scottish Courts as equivalent to money paid to reimburse the owners for trading profits which would have been earned had the repairs been carried out in accordance with the contract. As such it was a profit assessable to tax. (*Burmah Steamship Company v. Inland Revenue*, Court of Session, Dec. 5, 1930.)

A tax levied by virtue of the annual finance Acts and paid under an incorrect interpretation of the liability to such tax in a particular instance cannot be refunded by the Revenue, as the mistake is one of law. (*National Pari-Mutual Association, Ltd., v. The King*, Court of Appeal, Dec. 5, 1930.)

Companies.

It has been held that section 70 of the Companies Act, 1929, does not, by implication, repeal the rights of a company to issue stock warrants to bearer. (*Pilkington v. United Railways of the Havana and Regla Warehouses, Ltd.*, Chancery Division, April 10, 1930.)

Where the Articles of Association declared that a vote given in accordance with the terms of a form of proxy prescribed therein was to be deemed valid notwithstanding, *inter alia*, the revocation of the proxy (provided that no intimation in writing of such revocation should have been received at the office of the company), the High Court has ruled that a shareholder who had executed a valid proxy was not thereby precluded from voting in person. In the absence of any special contract between a shareholder and the company expressly excluding the right of the person in such circumstances to vote in person, the right of the shareholder to vote in person is paramount to the right of the proxy. (*Cousins and Another v. International Brick Company, Ltd.*, Chancery Division, Nov. 28, 1930.)

The meaning of the phrase "profits available for dividend," as applied to the rights of note holders in a company entitled to participate in the distribution of such profits, has been interpreted by the Courts as the balance of the net profits for the year, after providing any reserve or sinking fund which the directors, acting *bona fide* in the interests of the company, and with the authority of the Articles of Association, consider necessary. (*Long Acre Press, Ltd., v. Odhams Press, Ltd.*, Chancery Division, June, 1930.)

Bennett, J., in *Wimbledon and Putney Commons Conservators v. Tuely* (1930) ruled that "things which are incidental to a company's main purpose and against which there is no express prohibition in the Memorandum or Articles of Association, ought to follow from the authority for effecting the main purpose by proper and general means," and that the expressed power to employ and remunerate servants gave the corporation an implied power to provide pensions for them.

By virtue of section 5 (*a*) of the Companies Act, 1929, the Court may sanction an alteration in a company's Memorandum of Association with a view to enabling it "to carry on its business more economically or more efficiently . . .," and an alteration of the Memorandum authorizing the investment of a company's reserve fund is competent under this provision. (*Robert Hutchinson & Co., Ltd.*, Court of Session, July 16.)

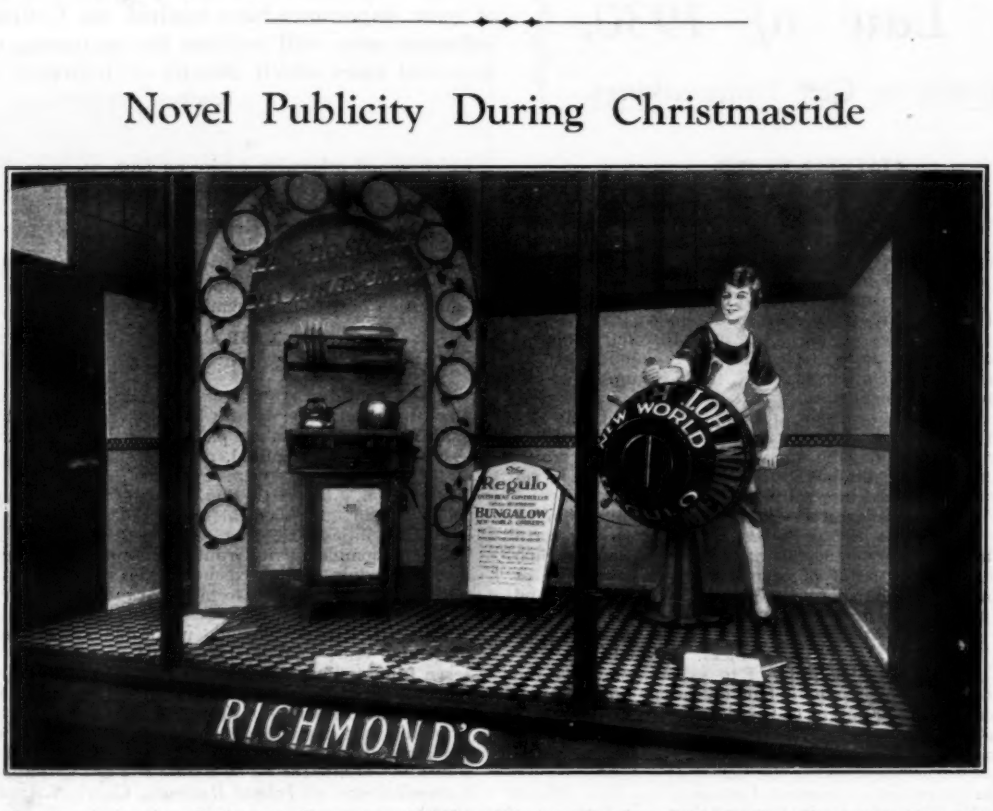
Stamp Duty.

It was held that a resolution passed by a limited company and confirmed as a "special resolution" empowering the directors to increase the capital of the company by resolution of the Board of Directors, was not such as to authorize an immediate increase of capital, and was not liable to Stamp Duty under the Act of 1891. (*Attorney-General v. Tube Investments, Ltd.*, Court of Appeal, Feb. 17, 1930.) It is to be noted that while this decision over-rules the judgment in *Attorney-General v. Anglo-Argentine Tramways Company* (1900; 1 K.B. 677), such a resolution empowering the directors to increase the authorized capital of a company is now invalid; section 50 of the Companies Act, 1929, provides that this power may be exercised only in general meeting.

Contract.

Where a company goes into voluntary liquidation and transfers its property to another company before the expiration of the term stipulated in a contract of service with an employee, it has been held that the company thereby repudiated the contract. While this would entitle the person affected to prove for the damage which he had suffered as a result of such cancellation of contract, Maughan, J., laid it down as the duty of that person to minimize the damage, and held that, if the offer of the amalgamating company to continue the contract at a reduced rate of remuneration were refused, the company in liquidation was justified in making a deduction from any claim for damages arising out of the contract. (*In re Gramophone Records, Ltd.*, Chancery Division, Feb. 10, 1930.)

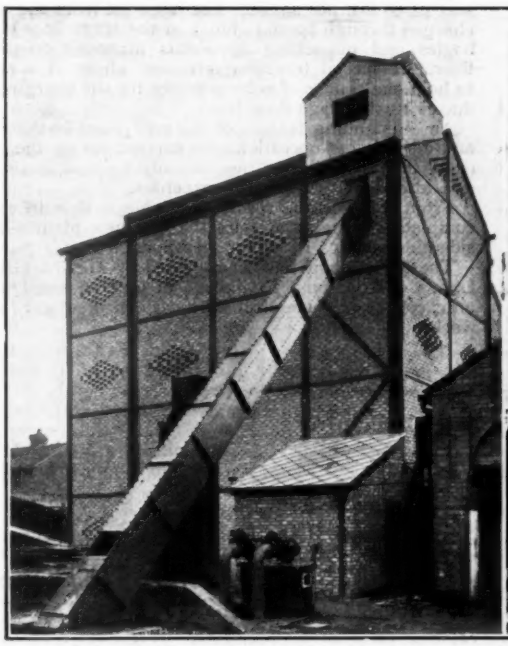
Novel Publicity During Christmastide



This photograph is of a Christmas Showroom Window Display showing Richmonds "Bungalow New World" Cooker and featuring the "Regulo" Heat Controller which enables the housewife successfully to "steer her every meal from course to course."

MODERNIZATION OF BALDOCK GAS-WORKS.

An improved type of Carbonizing Plant, of particular interest to small Gas Undertakings, has recently been inaugurated at the Gas-Works of The Baldock Gas Light and Coke Company.

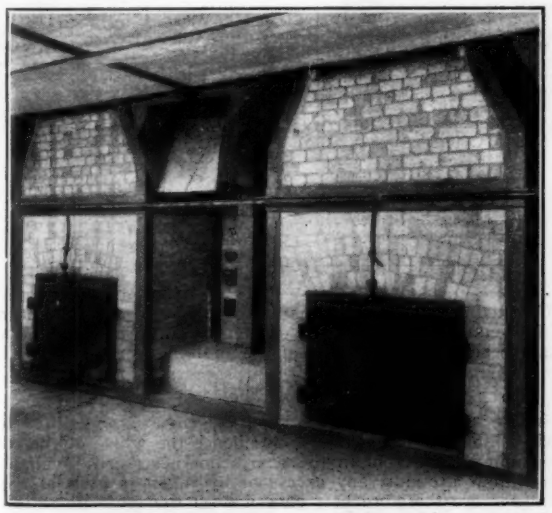


Rear View of Retort House, showing Coal Elevator and Steam Engine Room.

Front View of Retort House, showing Steel Roller Shutters, Producers, and Basement Floor.

For some considerable time past the town and environs of Baldock have been steadily developing in an outward direction, and, to meet the increased demands upon present gas production, the Board of Directors decided to equip the works with an up-to-date system of carbonizing plant.

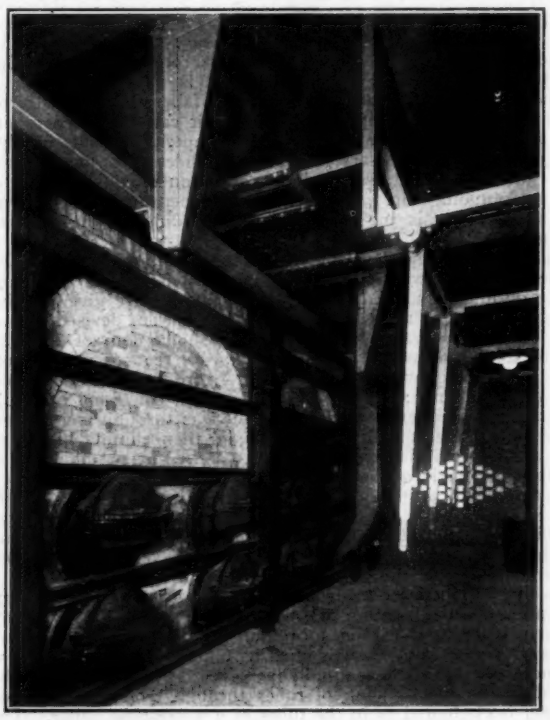
In the first instance the problem of modernizing the existing generator settings was seriously considered, but, owing to the extremely small dimensions of the existing retort house, this would have been a costly matter. Therefore, in view of improved manufacturing costs gained by other carbonizing processes, it was thought advisable to replace the old retort bench with a new plant on a separate site.



Front View of Projected Producers Serving Retort Settings.

Owing to the restricted ground space within the present gas-works boundary, several schemes were prepared for producing the maximum output from the smallest area; and with due regard to the expenditure incurred, it was finally agreed to approve the construction of a complete new inclined carbonizing installation.

The new plant was erected to the instruction of Mr. Henry



Inside View of Retort House, showing Charging Side Stage Floor, also Range of Overhead Coal Hoppers, Retort Filling Chutes, and Operating Gear.

Woodall, and incorporates a self-contained retort bench of ten inclined retorts, complete with coal handling plant accommodated in the stage-floor retort house. The retort bench consists of three through main arches filled in with one deep regenerator setting of six inclined retorts and one deep regenerator setting of four inclined retorts, also main flue, chimney, bench brickwork bracings, regenerator and producer bracings, mouthpiece bracings, self-sealing mouthpieces, ascension pipes, ascension bends, bridge pipes, dip pipes, suspended hydraulic mains, foul main, retort house governor, condensing main, tar main, tar tower, bench platforms, ladders, fender plates, together with charging and discharging side floors.

The retorts are of special fireclay quality 12 ft. in length tapered from 21 in. to 15 in. D section to 23 in. to 15 in. D section, and capable of efficiently carbonizing full charges of coal in a period of eight hours.

When the three main arches are ultimately completed with inclined settings of sizes, the retort bench will have a carbonizing capacity of 200,000 c.ft. of gas per diem, representing an output of approximately 670 c.ft. per sq. ft. of bench area.

The retort house comprises a steel framed and brick built structure, 31 ft. 8 in. wide by 37 ft. long by 34 ft. 6 in. high designed with two brickwork side elevations, one brickwork cable elevation, one asbestos sheeted elevation, asbestos sheeted roof, ventilator, sliding doors, boiler shutter openings, and rain water system. The layout of the building provides for spacious charging and discharging operating stages, together with commodious basement floors on both sides of the bench. Special provision is made in the retort house structure for the whole of the plant to be further extended at a later date.

The coal handling plant consists of an inclined continuous bucket elevator arranged for delivering broken coal direct to a continuous belt conveyor, distributing to a range of coal storage hoppers situated over the charging side of the retort house.

Each hopper compartment has a nominal capacity of 5 tons, and is fitted with bottom outlet doors and hand-operated lever gear for discharging the coal into travelling retort filling chutes.

The power required for operating the plant is provided by a single 5-H.P. steam engine working on an average steam pressure of 80 lbs. per sq. in. The hot coke from the retorts is discharged through special chutes in the stage floor direct to coke bogies and quenching apparatus arranged on the basement floor. A special travelling producer chute of a sufficient size to hold one charge of coke provides for the charging of the producers at the stage floor level.

An outstanding feature of the new plant is that all charging and discharging operations are carried out on the gravity principle, thereby obviating the necessity for complicated machinery and attendant maintenance expenses.

From the working results available to date in respect of the complete scheme, it appears that the new plant will effect considerable savings in existing production costs.

The entire plant has been erected by Messrs. Gibbons Bros., Ltd., Constructional Engineers, of London and Dudley, and is an excellent example of modern carbonizing plant for small gasworks.

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany.

SYNTHESIS OF PETROL FROM CARBON MONOXIDE AND HYDROGEN AT ATMOSPHERIC PRESSURE.

Franz Fischer, in "Brennstoff-Chemie," 1930, **11**, 489-500 (Dec. 15), gives a résumé of his work on the production of liquid fuels from carbon monoxide and hydrogen.

After a bibliography, an account is given of the experimental work leading up to the discovery of satisfactory catalysts. One of those mentioned consists of a contact mass of iron and copper (4 : 1) containing manganese, the mass being supported on grog or coke and rendered alkaline with 0·2 p.ct. of potassium carbonate. The copper acts as an activator for the iron and behaves as an intermediary "oxygen acceptor." Expensive supporting materials are unnecessary. The catalyst is made from the mixed oxides, which become reduced to the metals when the gas under treatment is passed over them. When the activity of the catalyst slowly falls off due to adsorption of products of high boiling-point, it can be raised again to a certain extent by elevating the temperature, but, finally, regeneration is necessary, and can be effected by passing air over the heated catalyst as long as carbon dioxide is present in the outgoing air. The working temperature for the synthesis of petrol is 392°-446° Fahr., depending on the catalyst employed.

The steps in the development of an experimental plant capable of dealing with upwards of 350 c.ft. of gas per hour are then outlined, and diagrams and descriptions are given of the various forms of reaction chambers which were devised before the final form was adopted. Complete freedom of the gas from sulphur compounds is essential. As regards purification of the gas, removal of sulphuretted hydrogen is first effected on standard lines; organic sulphur is then converted into sulphuretted hydrogen by passage of the gas through empty iron tubes at about 750° Fahr., and this is then eliminated except for a trace (less than 0·09 grain per 100 c.ft.) by scrubbing with potassium ferricyanide solution, the latter being regenerated electrolytically.

Since synthesis of petrol from the gaseous mixture generates sufficient heat to raise the temperature of the gas by 1800° Fahr., and since the temperature must be closely controlled within a narrow range of 18° Fahr. in the neighbourhood of 400° Fahr., in order to avoid methane formation, which commences at a temperature of only 90° Fahr. above this working temperature, and carbon formation which occurs at higher temperatures, suitable steps must be taken to dissipate the heat generated. This was finally achieved by building into the contact chamber a bank of tubes through which superheated water is circluated as in the tubes of a water-tube boiler. The apparatus in its present form is readily adapted to extension to a larger scale.

Economic Considerations.—The formation of petrol with a calorific value of approximately 21,600 B.Th.U. per lb. is accompanied by a heat evolution of approximately 20-25 p.ct. of the calorific energy of the gas employed. Hence such a quantity of gas as would contain 27,000 B.Th.U. (gross) must be used for the manufacture of 1 lb. of petrol. The cost of 27,000 B.Th.U. in gaseous form is therefore of great importance, even if the reaction is quantitative and if no other costs beyond those of manufacturing the gas are involved. Even if 1 therm of gas costs only 1d., the cost of the gas required for 1 lb. of petrol would be 0·27d. It is therefore obvious that only the cheapest gases come into question. Such gases or mixtures as are possible are included in the following table:

Gas or Gas Mixture and Cost in Pence per Therm.					Percentage of Available CO Present.	Theoretical *Maximum* Yield of Petrol. Lbs. per 1000 C.Ft. of Gas.
Coke Oven Gas (1·0).	Mixed Producer Gas.	Blast Furnace Gas (0·9).	Cracked Coke Oven Gas.	Water Gas (2·0).		
P.Ct.	P.Ct.	P.Ct.	P.Ct.	P.Ct.		
100	..	..	..	..	5·5	2·2
..	100	..	..	..	6·2	2·4
59·5	..	40·5	..	..	16·4	6·4
51·5	48·5	..	..	..	16·8	6·6
..	..	..	100	..	19·2	7·5
..	42·6	..	57·4	..	23·3	9·2
..	..	35·1	64·9	..	23·8	9·4
..	..	..	..	100	24·0	9·4
46·7	..	..	..	53·3	25·3	9·9
..	..	..	52·5	47·5	30·4	11·9

Cracked coke oven gas is obtained by treating coke oven gas with steam at a temperature of about 1832° Fahr., the main reaction being decomposition of the methane as follows:

$$CH_4 + H_2O = 3H_2 + CO$$

In the synthesis, two volumes of hydrogen are required for each volume of carbon monoxide; hence the whole of the carbon monoxide present in the gas is not necessarily available. On similar grounds, any excess of hydrogen is useless. Gas mixtures are therefore best chosen with the requisite ratio of carbon monoxide to hydrogen. From the table it is evident that the maximum yield of petrol is obtainable from a mixture of cracked coke oven gas and water gas. However, when the costs of the individual gases are compared it will be evident that the cheapest mixture is that of coke oven gas and blast furnace gas. Possibly mixtures of cracked coke oven gas and blast furnace gas or mixtures containing producer gas are equally cheap.

From the following table it will be seen that the heat re-

quirements in the gas increase very rapidly if the yield of petrol falls short of the theoretical.

Yield. P.Ct. of Theoretical.	Heat Required in the Gas. B.Th.U. per Lb. of Petrol Formed.	Cost of the Heat in Pence per Lb. of Petrol with Gas at 1d. per Therm.
100	27,000	0·27
50	33,705	0·34
30	42,750	0·43

The reason for this is that, if side reactions occur with reduction in the yield of petrol, these reactions also generate heat; hence the heat generated per pound of petrol increases as the yield of petrol decreases, and, if the yield of petrol is not as high as 50 p.ct. of the theoretical, the thermal efficiency will be very low. However, a 50 p.ct. yield is attainable, and has even been exceeded, though, so far, only exceptionally.

Among other items about which information can be given is the purification of the gas from sulphur. The first stage, removal of sulphuretted hydrogen, costs 0·17d. per 1000 c.ft., according to information supplied to the author. As to the second stage, conversion of organic sulphur into sulphuretted hydrogen by passage of the gas through heated iron tubes, no information can be given. The third stage—washing with potassium ferricyanide, which involves, for electrolytic regeneration, if 0·45 grain of sulphur per 100 c.ft. is present, and assuming a 50 p.ct. current efficiency, approximately 7 KW.-H. per million c.ft.—costs a negligible sum.

The most expensive part of the plant is undoubtedly the contact chamber. This, in the case of an installation handling 360,000 c.ft. of gas per hour, would require to have a capacity of 9000 c.ft., and if it were constructed from steel tubes, cast silumin blocks, and aluminium plates would involve, with accessories, an estimated cost of £65,000. The expensive cobalt-copper-thorium catalyst would cost £35,000; hence the total cost of the contact chamber alone would be £100,000. Such a chamber would have an annual output of 6000-7000 tons of colourless, sulphur-free, high-grade petrol not requiring any refining. It is believed, however, that the contact chamber could be constructed of iron, and it would, in that case, be cheaper. Moreover, it appears that progress is being made in the provision of a catalyst costing but a fraction of the above-mentioned contact mass. Success in this direction would result not merely in a reduction in cost, but also in an increase in throughput. The above figures have, however, been presented as representing present-day conditions, even though they may appear unfavourable.

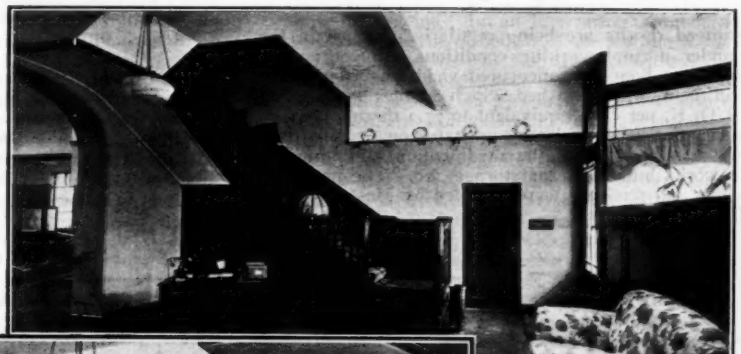
In connection with the above figures, no credit has been taken for the gas oil produced as a bye-product or for the residual gas, though the latter, being sulphur-free and having a calorific value in excess of 450 B.Th.U., might be worth more—for example, in some cases in the steel industry—than would a normal gas of similar calorific value.

Future Developments.—Apart from an anticipated reduction in working costs due to possible increased conversion efficiency and the development of cheaper and more active catalysts, there has recently been worked out a liquid-phase process analogous to the ordinary fat-hardening process. This consists in suspending the catalyst in sulphur-free—*e.g.*, synthetic—oil and passing through the mixture, at the necessary temperature —*e.g.*, 392° Fahr.—a finely divided stream of the gas. Furthermore, it is possible to obtain—for example, from methane—gases which will give much higher yields of petrol and oils per 1000 c.ft. than would any of the mixtures previously employed. By the partial combustion of methane with oxygen, a mixture of carbon monoxide, hydrogen, and acetylene is obtained, and this gives an actual yield of 6·2 lbs. of petrol and 3·1 lbs. of oil per 1000 c.ft. Finally, possibilities are always present of discoveries which will enable large-scale manufacture to be commenced, provided that the necessary gases are available sufficiently cheaply.

NEW SHOWROOMS AT JERSEY

These photographs give an idea of the attractive showroom premises which have just been opened by the Jersey Gas Light Company, Ltd.

On the right can be seen the entrance lounge.



On the left is a view of the showroom taken from the lounge.

VERTICAL RETORTS AT A SCOTTISH SEAPORT

Description of a Glover-West Installation — from "West's Gas."

The Grangemouth Gas-Works are owned by the town, and when, on the advice of their Engineer, Mr. Arthur Cuthbert, it was decided to reconstruct and modernize the works, a contract was placed with Messrs. West's Gas Improvement Company for the carbonizing plant, which was put to work at the beginning of October.

The installation comprises five Glover-West vertical retorts of the 40-in. "New Model," arranged in single line so that each retort is an entirely independent unit, being separately heated and controlled. There are two producers of the usual open step-grate type, each capable of supplying fuel gas for five retorts.

The installation is the fourth to be erected in Scotland on a design which is specially suitable for works with an annual demand of from 25 to 60 million c.ft.

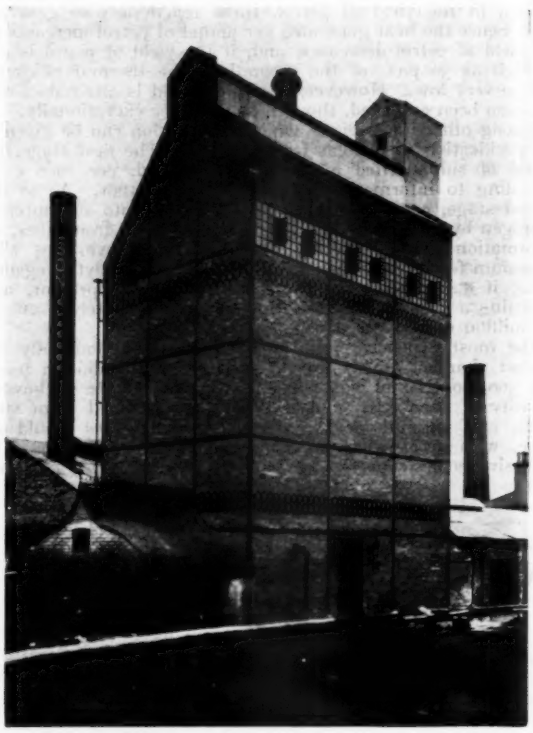
The foundation is a specially designed reinforced concrete double raft, decided upon after driving test piles which proved that the ground was unsuitable for piling. The retort house building is panelled with engineering bricks and has been arranged of such dimensions as to allow for an extension of a further two retorts when required.

Coal is brought from store in side-tipping bogies, and elevated to the overhead bunkers in a 25 cwt. electric lift. The discharged coke is wheeled to the yard, and the coke required for the producers is transported by the lift to the producer-feed storage hopper. The coke extractors are operated by two Bryan Donkin totally-enclosed vertical steam engines, one to act as stand-by to the other. These engines, together with switchboard for the lift, are placed in a tiled engine room built within the walls of the retort house. A new 28 ft. by 7 ft. Lancashire boiler, and also the original Cornish boiler, have been arranged alongside the vertical retort house for the sake of ease in operation. Breeze is delivered from the coke hopper, through a suitable chute, to the front of the boilers. The feed-water for the boiler is preheated by the exhaust steam from the extractor engines.

Working Results.

The guaranteed results are being regularly obtained in the new plant under normal working conditions. Over an observed period of 72 hours the measured yield was 16,365 c.ft. of gas per ton, using mixed washed Scotch doubles and making gas at 472 B.Th.U. per c.ft., equivalent to 77.2 therms per ton.

The reconstruction scheme also incorporated new condensing, washing and scrubbing plant, the modification and improvement of the works buildings, tar storage, &c. The new condenser, washer, and scrubber were supplied by Messrs. Henry Balfour & Co., Leven.



The Installation of Glover-West Vertical Retorts at Grangemouth, Scotland.

Mr. Cuthbert, the Gas Engineer, is to be congratulated upon his success in tackling and satisfactorily completing these extensive works' alterations. The undertaking is in a flourishing condition, the annual make having increased from 31 millions in 1918 to 59 millions in the year ended May 31, 1930; and we feel sure that under Mr. Cuthbert's able management it is destined to make even greater advances in the years to come.

C. A. P.

GAS SERVICE

Discussed from the viewpoint of the Gas Salesman.

A Christmas Display from Cornwall.

The Truro Gas Company are to be congratulated on having made a very effective Christmas show. In the window was a lighted gas fire with life size models of a boy and girl playing on the carpet with their Christmas gifts. At the side of them was a decorated Christmas tree, in front of which was a large card with the words: "The Gas Fire is the Modern Yule Log. It gives cheerful warmth without wearying work." In the background was a fountain of lights, while the whole was completed by a frieze depicting the activities of Santa Claus. Needless to say, this seasonble display brought many Christmas shoppers to the showroom windows.

Successful Exhibition at Grange.

The Grange-over-Sands and Cartmel Gas Company experienced so much public interest in the week's exhibition of domestic and other gas appliances, held recently at the Palace Rooms, Grange, that they extended the exhibition for a second week. Up to the end of the third day the number of visitors equalled a third of the population of Grange, and before the exhibition was finished the total of visits was higher than the population of both Grange and Cartmel, indicating that many people made duplicate visits.

New Showrooms at Skipton.

The Skipton Urban District Council Gas Department opened new gas showrooms in Keighley Road, Skipton, on Dec. 18, for the display and sale of all types of domestic and other gas appliances to the residents of the Skipton, Carleton, Embsay, and Gargrave districts.

"Flame."

This is the title of a monthly bulletin published by the Leicester Gas Department. The publication is full of wit and wisdom, and is proving thoroughly popular among the Department's consumers. Its pages contain much information about gas appliances and the comfort which their installation brings.

New York Prefers Gas.

A remarkable feature of the new Chrysler Building in New York—the highest building in the world—is a 6-in. gas main

running up to the seventy-first floor, a height of 777 ft. above the street level. The "Co-Partnership Journal" of the South Metropolitan Gas Company, in the January issue, points out that this preference for gas (it is being used for cooking and heating throughout the building) is a convincing answer to those who persist in dismissing gas as a thing of the past. "We are all familiar with the type of mind that regards electricity as the only factor of scientific progress, and that dismisses gas as a thing of the past," says the article. "If this were so, it would not, surely, be possible for the very latest building in such a 'progressive' city as New York to be supplied with an out-of-date and inefficient means of heat and power?" The building has a restaurant on the seventy-first floor, another on the sixty-sixth floor, as well as barbers' shops, beauty parlours, and other establishments.

Lectures on Salesmanship.

A course of five weekly lectures, on Jan. 23 and 30, and Feb. 6, 20, and 27, will be given by Mr. Cunliffe L. Bolling at the Barrett Street Trade School, Oxford Street, W. 1. The subjects to be dealt with include: Complaints and Claims; Studying the Goods; Advertising and Display; Stockkeeping; Systems. The fee for the course is 2s. 6d.; and applications should be made to the Secretary, London Employers' Association, 76, Wells Street, W. 1, or to the Principal at the School.

New Showrooms Opened at Devonport.

New showrooms were opened by the Plymouth Corporation Gas Department on New Year's Day at the junction of Fore Street and Chapel Street, Devonport. These are very spacious premises—formerly a bank building—and were inspected by the Gas Committee on the opening day.

A Gas Anecdote.

That there is humour in the kitchen is evident from the following story which appeared in a recent issue of the "Sunday Dispatch" and is quoted in the December "Bulletin" of the B.C.G.A.

Soon after reproving a maid I once had because the gas cooker was not clean, an inspector called from the gas company and told me that, as the cooker was of an obsolete type, it would be replaced by a new one. Mary must have heard him say that the cooker would be removed the next day, because, going into the scullery an hour later, I found a shining cooker, and Mary, crying bitterly, was polishing the brass plate stating, "Property of the —— Gas Company." "Surely, mum," she wailed, "he'll let you keep the stove now I've cleaned it up. I'll tell him it wasn't your fault."—Mrs. Newton, Esher.

GAS AT THE SCHOOLBOYS' EXHIBITION.

The Gas Light and Coke Company were exhibitors at the Schoolboys' Exhibition, opened at Olympia on Jan. 1, and demonstrated in an understandable and comprehensive manner the large number of useful purposes to which gas can be put.

The "Daily Mail" Schoolboys' Exhibition—claimed to be the greatest of all exhibitions ever organized for the young people of this country—was opened on Jan. 1, at the Empire Hall, Olympia, W., by the Lord Mayor of London (Sir W. Phéné Neal) and the Lady Mayoress; and at this exhibition it was very ably demonstrated by the Gas Light and Coke Company how interesting and instructive the subject of gas and its bye-products can be made to the younger generation.

The Gas Light and Coke Company had a main stand on the ground floor, while they were also exhibiting in co-operation with the London County Council on their stand on the first floor.

On their main stand the Company adopted quite a novel procedure in setting forth, in a manner calculated to interest visitors, the many and various ways in which gas and its bye-products can be usefully employed. This consisted in a series of little scenes—both domestic and industrial—showing gas in its daily work for the community. These scenes portrayed rooms and workshops set out like model stages, the figures and furniture in the foreground constituting skilfully painted cut-outs. The scenes were all in natural colours and very realistic.

The first few scenes depicted domestic rooms: A living room with a cheerful glowing gas fire with figures sitting before it; a tiled bathroom with gas storage heater and geyser; and an up-to-date kitchen equipped with a modern gas cooker and other labour saving devices. Distance-controlled gas lighting was also demonstrated. Other scenes indicated the uses to which gas is being put in the manufacture of motor-cars, newspapers, sweets, biscuits, while the value of sulphate of ammonia as a fertilizer to help to keep the cricket pitch and tennis courts green and thick (a point which should appeal to young visitors) and bring out the beauty of flowers in the garden was shown by a beautiful garden scene with a tennis court in the foreground.

A Model Gas-Works.

The key tableau of the stand was a most fascinating model gas-works of quite large dimensions, complete in many details. In the foreground was the riverside with steamers unloading coal; behind this the retort houses, gasholders, purifiers, and other plant, down to the works railway track, cranes, and hoppers.

Round the stand above the scenes were some facts and figures of the industry. Visitors were able to learn what a therm of gas is, what it will do, and how it does it. And to prevent one from forgetting all that was to be seen on the stand, there were two fascinating books, which were given to visitors to read at home. One described the large numbers of drugs, dyes and fertilizers and other substances obtained from coal, and tells how they are obtained. The other showed by description and diagram how gas is used and controlled in all sorts of gas appliances such as water heaters, cookers, refrigerators, and furnaces, and in some of the special apparatus used in the factories which cater for every need.

Round the top of the outside of the stand ran an electrically operated train under the caption "Follow the Beckton Coal Train."

The booklet on "What a Therm of Gas Will Do" was particularly interesting. In an interesting manner and with the help of diagrams the principles of the storage water heater were explained, refrigeration by gas, the modern gas cooker with its thermostatic control, distance control of gas lighting, the injector ventilator system on gas fires, together with details of industrial uses, including central heating, printing, tin box making, chromium plating, heat treatment, and so on.

Nobody cares, it was stated, whether they buy ten *cubic feet* of gas or ten thousand so long as they get enough *heat* for their money to heat the house or the bath water, or cook the dinner. Therefore the gas undertakings charge directly for *heat*; and, moreover, heat which can be brought into action anywhere at a moment's notice and which can be controlled automatically or by hand from near or far. The object of this booklet, therefore, is to explain what a therm of gas will do and should do, and, to show that there is no deception, how it does it.

In Co-Operation with the L.C.C.

On the L.C.C. stand on the first floor a series of exhibits were arranged showing the work done by boys and girls in London. On this stand a number of Gas Light and Coke Company apprentices, who attend, as part of their training, instructional classes at the L.C.C. Westminster Technical Institute, gave examples of the work done at Watson House involving gasfitting, joint blowing, &c.

On this stand also the Gas Light and Coke Company had fitted up a kitchen for cookery demonstration purposes.

Boy chefs in training, with boy waiters in attendance, are giving displays on and after Tuesday, Jan. 6, until the close of the Exhibition. Cookery demonstrations are being given to show the skill of pupils at central and elementary schools. Adult students in a bachelor cooking class at a Men's Institute (evening) will give a demonstration, as well as students from a recently established bakery class at a junior technical institute (evening). Cookery demonstrations by senior girl students at Polytechnics are also being given.

It is of interest to note that the Gas Light and Coke Company obtained the back cover space of the Exhibition catalogue for a valuable gas advertisement in colour. This portrayed a gas-works in the centre with a coal steamer approaching from the background. The gas leaves by pipe and bye-products by goods trains from the near side and radiating into the foreground—these trains containing coke, tar, creosote, benzole, fuel oils, drugs, dyes, disinfectants, and sulphate of ammonia.

THE "JOURNAL" TECHNICAL RECORD

Which also contains Full Reports of Meetings of Gas and Allied Associations

Pipe Joint Research

A Progress Report presented to the American Gas Association by K. R. Knapp, Research Engineer, American Gas Association Laboratory

Introduction.

Active work on this subject was started on July 1, 1929, at the Testing Laboratory in Cleveland. This report covers work done up to Aug. 31, 1930. At a meeting of the Pipe Joint Committee held on July 8, 1929, it was decided to restrict the research programme for the present to bell and spigot joints, and with this as a basis to take up other phases of the subject later. An initial testing programme was accordingly adopted by the Committee. This consisted of three parts: First, a study of old joints removed from service to determine the best means of repairing them; secondly, the testing of various new joint combinations; and finally, a study of miscellaneous jointing materials such as yarn, cement, and lead.

Old Joints.

The subject of old joints was considered to be of particular importance in view of the number of them in service, changes in gas conditions, increase in line pressures, and various other reasons. An early start was made on this phase of the investigation by requesting a number of member companies to send samples of old joints to the Laboratory which had been in service for ten or more years. If possible, the companies furnishing such joints were asked to obtain specimens which were leaking in service. Within a few weeks about thirty joints ranging in size from 3 in. to 8 in. were received from locations scattered all over the United States.

Leakage tests were made on the joints received, and most of them were found to be leaking. Leakage was found to be most common in the case of the lead joints, a separation between the spigot and the lead being noticed on a number, especially the older ones. This indicated that a certain amount of lateral movement had taken place between the two halves of the joint. Little evidence, however, was noted of any appreciable protrusion of the lead beyond the bell face. While several of the cement joints were also found leaking, a number proved to be entirely tight on the test pressure used.

A test procedure was devised to determine the amount of bending or deflection to which the old joints could be subjected before leakage started. This test consisted in mounting the specimen, which was usually about 6 ft. in length, with the ends closed by line caps, on two supports spaced 5 ft. apart. Loading was applied upon the side of the bell, which was located midway of the supports through a thrust block curved to fit. This was done in a 60,000-lb. Riehle testing machine. The load and deflection were noted at which leakage occurred when a pressure of 10 lbs. was maintained on the joint. One-half inch was selected as the maximum deflection to be given.

This test was repeated four times, the joint being rotated a half turn between each set of loadings. The tendency was usually to leak first at the spigot on the underside, as the joint material tended to pull away from the metal of the spigot. It was found that the cement joints tested required the application of a higher load to produce leakage than did the lead joints. The load to produce the maximum deflection was also much higher with cement joints. In all cases leakage was produced to some degree on the first loading. The test was continued, however, until all four loadings had been given to indicate the extent that leakage increased.

In making these tests it was found that two 4-in. specimens with cement joints fractured in a clean break just in front of the bell. While leakage had occurred earlier, the compressive strength of the cement was high enough to prevent the joint from being entirely destroyed before the tension in the wall of the pipe mounted to a point sufficient to cause fracture. This behaviour may explain somewhat the breakage of smaller mains with cement joints under high transverse loads.

As a guide to the type of repair to be attempted, a questionnaire was sent to a number of distribution engineers throughout the country, asking for their experience and recommendations in repairing leaking joints. An analysis of about twenty-five replies showed that the recommended methods of repair could be grouped into three general classes as follows:

A. Cut out old joint material and remake joints.
B. Recaulk.
C. Apply leak clamps.

The plan adopted in making repairs was to follow the methods in general use as brought out in the various questionnaires received. After one of the old joints had been so repaired, the tightness of the repair was determined by an air test at 50 lbs. pressure. The joint was then given a deflection test similar to the one previously discussed. Its performance in this test was taken as a yard-stick of the effectiveness of the repair.

It was found entirely possible to make a tight joint by following the various methods involving cutting out the old material and remaking the joint. The results of the deflection test, however, were unsatisfactory in practically all cases. Where rubber rings were used it was found that a disalignment of the spigot in the bell rendered it difficult to make a satisfactory repair. In cases where this had apparently been made, the results of the deflection test differed little from those obtained with other joints which had been remade by different methods. Tests are now under way using two different types of rubber rings to establish whether proper applications can be made in joints under all conditions, and to determine whether satisfactory results under deflection can be secured. These tests have not advanced as yet to the point where definite conclusions are practical.

No separate tests were made on the performance of re-caulked joints. There appeared no reason for expecting any different results than were obtained on some of the joints re-made with cast lead and lead wool.

The use of leak clamps gave from the start much more favourable results. This was in spite of the fact that the first applications were made to joints which had previously been deflected to leakage and were not repaired before installing the clamp. Some of the joints were noticeably broken. It soon became evident that the use of gasket cement tended to improve performance, and in all but the first few joints clamped this cement was used.

All tests were made on 4-in. and 6-in. specimens. The plain rubber gaskets were found to give better results than were secured from the duck and rubber type. The best results, however, were obtained when a smooth bell face was encountered in which the lead had been recaulked to bring it to within ¼ in. or less from the face of the bell. The use of a gasket wide enough to permit an appreciable overlap on the bell face beyond the lead was also found conducive to better performance than when a narrow gasket was used.

The general results from the application of leak clamps are much more satisfactory than anything else attempted to date for the permanent repair of small bell and spigot joints. Additional tests will be made in the near future on 16-in. joints to determine whether these results will also hold good in the case of larger sizes.

New Joints—Small Size.

Considerable work has been devoted thus far to the testing of new joint combinations. The method used has been designed to reproduce as far as possible the effects of seasonal contractions and expansions on joints caused by variations in ground temperatures. A plan was worked out by which a sample could be placed in a testing machine and alternately pulled apart and pushed together, each tension and compression being the equivalent of one year's temperature change on the joint.

When the test programme was first laid out, the plan was to subject each joint to a series of 25 tensions and compressions, or reversals, as they were commonly called, each equivalent to a 60° change in temperature. Thus the effects of temperature

changes over a 25-year period were reproduced. This test condition was soon found to be so severe that most of the joints failed at the start. The testing schedule was accordingly modified so that the first five reversals were made on a load corresponding to a 30° temperature change, followed by five each at a 40° and 50° temperature change respectively. These tests were followed by a series of 25 reversals as before, corresponding to a 60° temperature change, and if the joint remained tight at the end, the pressure was increased in 10-lb. increments to 50 lbs., with a single reversal at each pressure. In nearly all cases leakage occurred before the 60° cycle had been completed.

All the earlier tests were made under a uniform pressure of 10 lbs. The results naturally gave no indication of what might be expected at lower pressure conditions. Considering the performance which the cement joints especially gave at 10 lbs. pressure, further modifications in the conditions of test appeared advisable. This was especially the case in view of the long service which has been given by cement joints under low distribution pressures.

The Pipe Joint Committee accordingly decided that the test pressures should be revised to the extent that 10 lbs. was used only until failure of the joint took place. The pressure was then reduced to 1 lb. and the test continued until failure took place at that pressure. Finally, the pressure was reduced to 10 in. of water column and continued to failure or until the prescribed number of reversals had been made. The point of failure in each case was taken as that at which leakage appeared.

After a few tests had been made under the revised conditions it was quite evident that the results were of much greater significance than those first obtained. A number of joints were found to be tight at 10 in. pressure after 40 reversals had been completed. In order to make the point of failure as definite as possible the first appearance of a leak at any pressure was taken as the point of failure for that pressure. After a few tests had been made, this method was modified to the extent that leakage on the next succeeding reversal was required to take place before failure was said to have occurred.

A considerable number of joints of different kinds were tested. All were of the 4-in. size and consisted of cement and cement mixtures, lead, and combinations of rubber rings with both cement and lead. The greater part of the testing was devoted to cement joints, and the work on this type of joint has been largely completed.

Full information of the details of preparation of the sample joints and tabulated results of the tests made are shown in the Third Progress Report on Pipe Joint Research dated June 30, 1930. A brief summary only will be given here.

Two kinds of cement were used for preparing the joints, one known as Lehigh, of the ordinary Portland type; the other Incor, of a high early strength variety. The latter is a Portland cement especially manufactured to produce a product capable of developing within 48 hours a strength comparable to that of ordinary cement at the end of two weeks. The same joints were prepared using neat cement, cement and sand mixtures, and cement together with admixtures or substances added for such purposes as water proofing, acceleration of set, reduction of shrinkage, &c. Considerable attention was also paid to the preparation of the joint material and the method of driving, using square braided jute.

It soon became evident that the item of pressure was of considerable importance. Most of the joints were found to be tight at 10 in. of water column after they had been subjected to the entire cycle of 40 reversals. This was in spite of the fact that leakage had in most cases taken place rather early at 1 lb. pressure. A few joints were found to be tight at 1 lb. at the end of the test. These included only about 10 p.ct. of the total number tested, and were all of the No. 2 bell type.

From preliminary experiments with joints made using Lehigh cement, hardened by standing in dry air, it was shown that such joints leaked at a low pressure when first tested for tightness. To overcome this defect the freshly made joints were wrapped in wet burlap which was kept moist during the hardening period. In almost all cases joints so made proved tight under an initial test pressure at 50 lbs. Joints made of Incor cement, while somewhat improved by similar curing with wet burlap wrappings, did not show the wide range of performance between dry and wet curing as did the Lehigh samples.

An extension of this plan was applied by curing fresh joints in damp sand and in clay, both with and without wrappings of wet burlap. The results were generally rather less satisfactory than when wet curing only was used. Screened sand and cement in different proportions were used in the preparation of several joints to contrast the performance of this mixture with that of neat cement. A mixture of equal parts of sand and cement was found to give the best results. While there was not a great deal of difference in the test performance of such joints from those constructed of neat cement only, the sand-cement joints were found to be more resistant to leakage under the higher test pressures. This may have been due to the higher bond strength between the mortar and cast iron. The breaking down of this bond required the application of a somewhat higher load.

Trial was also made of the use of a number of admixtures with cement. They seemed to possess no particular advantages that could not be secured from cement or cement and sand properly cured. An attempt was also made to avoid the necessity of wet curing by treating the surface of the joint with an impervious coating which would tend to prevent the loss of moisture. This plan, however, did not prove desirable, and was found much less effective than wet curing.

An interesting comparison between the performance of No. 1 and No. 2 bell joints may be made from this series of tests. It was found in the first, No. 2 bell joints tested, that nearly all the leakage occurred around the bell, and it was concluded that this was due to the tapered design of the bell, which made thorough driving around the bell at the bottom of the joint more difficult than when the No. 1 bell was used. The latter No. 2 bell joints were prepared by filling the joint about two-thirds full of cement before the first driving was done and then making the final drive with front yarn after refilling to the face of the bell. This was found to result in a much improved test performance. Leakage, however, still took place in most cases around the bell rather than at the spigot.

With No. 1 bell specimens, leakage was also found more often at the bell than at the spigot; but the proportion of bell leaks to spigot leaks was much lower than with the No. 2 bell. The test performance of the No. 1 bell joints was less satisfactory than when the No. 2 were used, but it is doubtful whether much significance should be attached to this indication. The castings used in the preparation of all test joints were machined at the base of the bell and the end of the spigot so that an iron-to-iron contact was obtained all around the joint. Where any high spots may be present, as is apt to be the case with commercial pipe, such contact could not be secured, and a possibility is present of the occurrence of slight movements which may tend to loosen the joint. For this reason too much weight should not be given to the improved performance of the No. 2 bell specimens, considering the favourable conditions under which they were prepared.

A total of about 75 cement joints were tested in this part of the investigation, excluding the preliminary specimens. The results of these tests seem to indicate that more favourable results are obtained with pressures not exceeding about ½ lb. It was felt that a mixture of equal parts of ordinary Portland cement and sand properly prepared and cured probably represents the most advisable combination for general use.

Some test work was completed on small joints using lead and a combination of rubber rings, with cement and lead. These tests have not as yet been conducted in as much detail as in the case of cement, and therefore no final conclusions can yet be drawn. Several points may, however, now be discussed in a general way from the results obtained thus far. It has been found difficult to secure satisfactory performance from most of the samples tested in which cast lead was used. It was found that when specimens were used in which cement joints had formerly been prepared, the surface of the spigot had evidently been damaged somewhat by the chisel in cutting out the former joint material. Poor results were obtained in practically every case in which such spigots were used. Most of these joints failed to prove tight under the initial pressure test before any load had been applied. Similar trouble to a less extent was also encountered where new pipe was used.

In order to obtain the most favourable conditions possible for the successful performance of a joint, a few spigots were prepared in which the face of the piece was machined down to bright iron from the bead at the spigot to a point just above the top of the lead in the finished joint. The thought was that when a smooth surface was used in contact with the lead the tendency for rough spots on the pipe to tear the lead surface as movement occurred would be eliminated.

Specimens prepared using these machined spigots gave much more satisfactory performance than previously obtained with the rough spigots. A few joints remained tight at 1 lb. pressure for the full schedule of reversals. There was, however, little consistency in their performance. It appeared that while a smooth spigot tended to improve considerably the performance of a cast lead joint, it did not solve the problem entirely.

A few joints were prepared using lead wool caulked by hand, but their performance under test was not encouraging. Some lead wool joints were then prepared caulked by an air hammer. The preparation of such joints was rather difficult with the tools available which were intended for use on larger joints. It was necessary to grind them down somewhat to allow their use to advantage on the smaller joints. Notwithstanding this fact, the test performance of the lead wool joints so prepared was highly satisfactory, and indicated strongly that this type of joint properly caulked had decided possibilities.

A combination of square braided jute together with a rubber ring held in place with cement was also tested. Three different kinds of rubber rings were used. One of them was found to give results which were highly satisfactory notwithstanding the fact that the joints tested represented practically our first experience with this form of ring. The other two rings proved much less satisfactory.

The same types of rubber rings as before were also examined

in combination with cast lead in place of cement. The type which proved most satisfactory with cement also did so with lead, although the results were not quite as satisfactory as with cement. The two other types of rings, however, gave an improved test performance over that with cement, although this was still much less satisfactory than was the case using the first type of ring. In one type of ring, a cold lead strip premolded to fit the cross section of the ring was caulked into place before the final lead was cast. The use of this cold strip appeared somewhat to improve the performance of this particular ring, as it permitted much better compression of the rubber than when lead was cast directly upon it.

Further tests are proposed before sufficient data will be available to permit making definite recommendations on the use of the type of joints just described. From information now available a combination of rubber with either cement or lead appears a desirable combination for higher pressures. It is probable that further experiments will indicate more clearly some of the details to be observed in preparing such joints to secure the best performance.

New Joints—Large Size.

During the past few months work has been in progress on tension and compression tests of 16-in. joints. This has been carried on at the University of Pennsylvania in Philadelphia. Some earlier tests made here were distinctly disappointing, due to irregularity in the mounting used in the large testing machine available for the work, and which proved difficult to overcome. A member of the Laboratory staff has been stationed in Philadelphia continuously since June, and the previous difficulties have been met. Some trouble has recently developed in breakage of the castings used for the sample joints under the high loads necessary to carry on certain joints. This has necessitated some further modification of the details of the mounting originally planned when the specimens were first obtained.

Several cement, and cement and sand, joints have been tested using specimens of both No. 1 and No. 2 bells. The greater number were prepared using the No. 2 bell, as it was felt that better results should be obtained in view of its greater depth, together with the tapered design. However, the performances were uniformly poor where neat cement was used, and were but little improved with a mixture of equal parts of cement and sand. All the earlier samples were prepared using a hand hammer for driving the front yarn. Two recent specimens were made in which the air hammer was used. These gave considerably better results, one remaining tight at 10 in. pressure during the entire number of reversals. The advisability is thus strongly indicated of using pneumatic caulking to a greater extent in the preparation of cement joints, especially in those of larger size.

Some tests have also been made using cast lead caulked both by hand and by air and using lead wool caulked by air. Hand-caulked cast lead joints have been found decidedly unsatisfactory, and considerable trouble was found in securing initial tightness. Cast-lead joints air-caulked were a decided improvement, and lead wool joints air-caulked were greatly superior. Two lead-wool specimens remained tight at the 1-lb. pressure at the end of the full series of reversals.

Trial was also made of some combination cement and lead joints, using a special bell 6 in. deep, with straight sides and no lead groove. In some, cast lead was used at the top of the cement, in others lead wool. The latter gave much the better performance, remaining tight at 10 lbs. until fracture of the specimen occurred about half way through the test. This type of joint appears to deserve further investigation.

All the work thus far completed on large joints appears to indicate strongly the superiority of those in which a pneumatic hammer is used over those hand caulked. In view of the comparative performances so far obtained, it appears desirable in preparing further specimens to utilize pneumatic caulking to the greatest possible extent.

Miscellaneous Tests.

Cement.—Certain physical tests have been conducted on jointing materials such as cement, lead, and yarn. A discussion of those made on cement is given in detail in the Third Progress Report. While it was found to be possible to obtain consistent results in testing specimens for compressive strength, this was by no means the case when other tests were attempted, such as securing the strength of bond between cement and iron as found in a joint. The results of a set of tests made some time ago to determine this point showed such a wide variation that it was felt that they were of little value. The best measure of the effectiveness of a material such as cement for jointing work seems to be the performance of the joint in which it is used. In general, the performance of cement joints, except under quite low pressures, left so much to be desired that it was felt that physical tests alone on cement would have little significance. Probably the most valuable tests made were those showing the variation in compressive strengths between air-cured and wet-cured samples. It is significant that some of the wet-cured samples showed an increase of over 100 p.ct. in compressive strength above those cured in dry air.

Lead.—An investigation of lead was started by making a chemical analysis of a number of representative pig leads obtained from some of the larger gas companies. There was found to be but slight variation in the compositions of these different samples indicating that it was not logical to suppose that any great difference existed between them. A series of photomicrographs of the various samples showing their grain structures were also prepared. While these indicated some difference in the form of the crystals, they did not appear of major significance. The most important feature of the investigation of lead was that relating to a determination of the effective depth of caulking done in different ways and with tools of varying widths. The samples were prepared by casting the joint in the regular manner in a special split sleeve in which a shoulder had been cast 4 in. from the bell face to serve as a support for the spigot. After caulking, the sleeve was unbolted, and a cross-section of the lead portion of the joint cut out. This was suitably polished and etched for the preparation of a photomicrograph. The enlargement was such that it was possible to determine readily the depth to which caulking had been effective by noting the variation in the arrangement of the lead crystals.

A number of such photomicrographs were made of samples which had been caulked with tools of various widths in different combinations. It was finally determined that the best results appeared to have been secured by first chiselling the lead around the spigot and then caulking successively with four tools, $\frac{3}{16}$ in., $\frac{4}{16}$ in., $\frac{7}{16}$ in., and $\frac{1}{2}$ in. in thickness respectively. The resulting effective depth of caulking with this combination was nearly $\frac{1}{2}$ in. close to the spigot and decreased gradually to a point near to the face of the bell. These tools were accordingly adopted as standard for lead caulking. The same width tools were also used for pneumatic caulking.

Yarn.—Several yarn samples obtained from different companies were placed in pipe containers and subjected to the continuous action of manufactured gas to determine its effect on the material. The purpose was later to subject the yarn to the action of dry natural gas to see if any change could be observed. Using coke oven gas, the only change in the yarn after several weeks' exposure appeared to be an increase in weight due to moisture absorbed from the saturated gas. On passing dry natural gas over this yarn the moisture was absorbed, but no other change could be detected. The amount of oil and similar material deposited on the yarn by the coke oven gas appeared to be negligible.

A variation in this procedure was then made by saturating the yarn with drip liquor and then exposing it to natural gas. Much the same effects were obtained. It is likely that better results would have been obtained by using drip oil from which most of the water had been drawn off. New tests are now being made in which this plan is followed.

Vibration.—Experiments have been undertaken to secure some information on the intensity of vibration of mains under modern heavy traffic. An instrument known as the telemeter is being used for such measurements. This consists essentially of an adaptation of a strain gauge in which a series of carbon elements is held together under a certain pressure controlled by a screw. The arrangement is such that any movement or vibration of the object to which this mounting is attached causes a change in pressure on the carbons, and thus changes their electrical resistance. The extent of this change is indicated by the deflection of a galvanometer, the light beam being thrown on a moving film driven at a fixed speed by a motor. The instrument is quite delicate and capable of measuring vibrations of small magnitude. As a first step in this work, an instrument specially prepared for the purpose was installed on a 12-in. main with 3 ft. of cover, located about 2 ft. from the curb on a main highway close to the Laboratory. The street chosen carries a double line of car tracks and is much used for heavy trucking. The paving is granite block with a heavy concrete base. The necessary electrical leads from the instrument, which was rigidly clamped to the main, were run through a temporary pipe line to the Laboratory where the indicating devices and the camera were installed. For the purpose of the first investigation a location close to the Laboratory was purposely selected so that the necessary preliminary work could be done to the greatest advantage. It was found that considerable experimenting was necessary before any actual observation could be made.

The results obtained so far indicate that vibrations of an appreciable magnitude were set up by the passage of street cars on the side of the street closer to the main. Cars on the opposite track registered only a slight vibration. Passenger cars and even trucks passing between the main and the nearer car rail appeared to cause little or no vibration. From the observations taken so far, it appears unlikely that such vibrations as are caused by ordinary traffic are of sufficient intensity to have much effect as a primary cause of leakage. It is hoped to secure further information along this line during the progress of the vibration tests to be made in connection with the testing programme on mechanical joints. The proposed plan of tests calls for subjecting these joints to vibrations which will far exceed in intensity anything likely to be encountered in service. They should serve to develop interesting facts on this subject.

Tests of Mechanical Joints.

Arrangements were concluded some time back with the Cast-Iron Pipe Research Association by which tests of certain mechanical joints were to be made, the expense of such tests to be borne by this Association. The proposed schedule which is quite comprehensive may be divided into three classes as follows:

A. Longitudinal movement.

B. Vibration.

C. Lateral deflection.

Each individual joint is to be tested under all of the conditions mentioned. Gaskets of different kinds such as plain rubber, duck and rubber, rubber with lead tip, and asbestos will be tried, both with and without the use of joint compound. In certain cases trial will also be made of different spigot diameters representing standard, oversize, and undersize pipe. Thus far the test work has been confined to longitudinal movements only using pressures of from 50 to 150 lbs., together with a maximum movement of the joint of $\frac{1}{2}$ in. Most of the specimens tested have given quite encouraging performances and have remained tight at the end of the prescribed number of reversals. These tests have been especially severe in that no joint compound has as yet been used. Considering this, their performance can well be viewed with satisfaction.

Conclusions and Recommendations.

This heading may be somewhat misleading, as it is not the intention of this report to draw any final conclusions or recommendations, although it is felt that some comment on the lack of them is in order. Work has been started on so many phases of the subject that it has been impossible to cover completely any one phase, and until each particular subject is exhausted, it would be premature to draw conclusions or make final recommendations.

Another factor that has entered into this work is that where deficiencies in joints have been revealed, thought has been stimulated towards correcting these deficiencies from which may arise joints superior to those now generally used. Another year's work should clarify many points now at issue.

Future Activities.

Among the subjects either receiving attention at present or to be taken up in the near future are the following:

A. Investigation of the use of rubber rings in the repair of leaking joints.

B. Application of leak clamps to large mains.

C. Continuation of tension and compression tests on large and small joints.

D. Study of vibration using the telemeter.

E. Testing of mechanical joints.

F. Investigation of the effects upon leakage of change-overs from manufactured to natural gas.

The most pressing question to be solved at present is that of the best methods of repair of leaking joints. Special attention is now being paid to this problem, and it is hoped that a more complete report on this part of the investigation can be issued in the near future.

Scottish Junior Gas Association (Western District)

Visit to the Works of Messrs. G. & J. Weir, Ltd.

On Wednesday, Dec. 10, about fifty members of the Association visited the works of Messrs. G. & J. Weir, Ltd., Cathcart, Glasgow.

Description of Works.

It is only natural that when visiting a large organization with many departments and multifarious activities, one should start at the same point as the raw materials used in the manufacture of the finished products—that is, in the works laboratory. When being conducted round the works of Messrs. G. & J. Weir, Ltd., and of the associated firm, Monel-Weir, Ltd., the visitors therefore started at the efficient and completely equipped physical and chemical laboratory.

Under the able direction of Mr. J. Arnott, Chief Chemist, the various pieces of apparatus were examined and demonstrated. The testing of metals for tensile strength on the Olsen testing machine, for brittleness on the Izod machine, for hardness on the Brinell, and, for specially hard materials such as case-hardened parts, the Shore scleroscope, and for ductility by means of the Erichsen machine, was demonstrated. A special pyrometer room is devoted to the study of heat treatment of metals.

In the chemical laboratory elaborate arrangements are provided for testing, both for regular routine purposes and for special investigations into the behaviour of various products under the wide range of conditions met with in service. A special balance room contains not only the delicate balances, but an electric muffle, carbon combustion apparatus, and apparatus for electrolytic metals. The metallurgical microscope with camera, and the adjoining dark-room were also inspected. The whole of the laboratory building is well appointed, with rubber floor coverings, white acid-proof painted ceilings, tiled walls, &c., and a complete service of electric current, water, gas, compressed air, &c., is provided throughout.

From the laboratory the party were conducted through the workshops, time unfortunately preventing as thorough an inspection as the vast plant warranted. The heavy machine shops tool room, with its delicate measuring machines and gauging devices, the turbine and centrifugal pumps shops, standard direct-acting pump shop (where line production of the standardized feed and service pumps is carried out on mass production principles), erecting and testing bays were visited.

The visit to the large foundry was necessarily brief, on account of the extensive structural alterations being carried out to enable larger castings to be made and still better production facilities to be available.

A glance only at the pattern shops, boiler house (for the supply of steam required for testing purposes), Monel metal rolling and drawing shops and stores, coppersmiths' shop and smithy, &c., was all that was possible on account of the available time. Many interesting sections had to be passed with merely a mention of their existence.

The products of this huge establishment, which covers some 17 acres, are divided into two main sections—Monel metal in sheet, rod, tube, and rolled section form and as the finished article; and the many power plant auxiliaries manufactured by G. & J. Weir, Ltd. These include feed pumps, water and oil general service pumps, oil fuel pressure pumps, air pumps, regenerative condensers, and complete condensing plants for turbo-generators, turbine-driven rotary pumps for circulating, feeding, and other duties. The production of fresh water by the use of their evaporating and distilling machinery, the firm's advocacy of heating and de-aeration of boiler feed, and their pioneer development of the "Closed Feed System" are well known.

In the manufacture of their specialities, the conditions are to a degree favourable to a system of standardization which has always been kept in view in the organization and equipment of the works, with the result that a large range of capacities and sizes of the firm's products are manufactured under the best repetition conditions. In the lay-out of their works, the firm have been alive to the economical advantages of direct lines of communication and correct routing of material in its progress through the various shops, which include numerous machines of great precision specially designed by the late Mr. James Weir for specific duties.

The present large factory was established at Cathcart in 1884 for the manufacture of the now well-known marine auxiliaries by the two brothers George and James Weir.

One is struck with the cleanliness and orderliness which pervades the whole of the shops, and which speaks volumes for the thought, control, and organization which lie behind the operation of such a plant.

The items of special interest to gas engineers from their own plant point of view, were the boiler feed pumps, feed water heaters, and general service pumps for both steam and electric drive.

After the visit the members were entertained at tea. Mr. D. D. Melvin, President of the Association, expressed the thanks of the Association for the hospitality shown; and Mr. Parker (Messrs. Weir) expressed, on behalf of the firm, great pleasure in having the Juniors as visitors.

Gas Dehydration at the Municipal Gas-Works, The Hague

Report on the Cost

Writing in the issue of "Het Gas" for Dec. 15, 1930, Mr. J. Rutten, Director of the Municipal Gas Department, The Hague, states:

After completing prolonged observations, I give below a summary of the costs of the gas drying process at our works.

Our plant was designed and erected by Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, England, whose process has been fully described previously (see, among others, "Het Gas," 1928, 70 *et seq.*, and 1929, 557 *et seq.*); and further description is therefore not necessary. I wish to state, however, that our plant has been working continuously for about one year, and has proved to need very little supervision or attention.

In connection with the table of operating costs given below, it should be mentioned that we dry our gas on the outlet of the gasholders, so that the rated capacity of the plant is higher than the average input to the holders; and as we pump our calcium chloride solution at a constant rate, this rate is not truly in proportion to the amount of gas treated.

We can say that a preliminary result of our gas drying plant has been to reduce the quantity of water pumped from district syphons during the period April to November, 1930, to less than 5 p.ct. of that removed during the corresponding period of 1929, before gas drying was begun.

Water in the syphons has indicated leaks in the mains, locally. In some instances, however, we have found deposits of volatile oil in the syphons.

The total cost of the plant was Fl. 88,885, or £7407. Amortization is rated at 9 p.ct. per annum, equivalent to Fl. 7999, or £666 11s. 8d. per annum. The cost of adminstration, direction, and social services is not included in the table. As the supervision of the plant is only a part of the duties of the attendant, we have included only 50 p.ct. of his wages.

Operating Costs.

The average daily output for the first half-year of 1930 was approximately 192,000 cub.m.—*i.e.*, 6,780,000 c.ft.

The costs per day from our records are given below:

	Fl.	£ s. d.
Interest and amortization	21·91	1 16 6
Maintenance	2·74	0 4 7
Electric current at 6 cents. per KW.-H.	0·96	—
,, ,, ,, 1·2d. per KW.-H.	—	0 1 7
Steam at Fl. 2·50 per ton	9·00	—
,, ,, 4s. 2d. per ton	—	0 15 0
Oil, grease, and cotton waste	0·32	0 0 6
Wages (attention and supervision)	2·40	0 4 0
Calcium chloride replacement	0·14	0 0 3
	Fl. 37·47	£3 2 5

For 192,000 cub.m., equivalent to:

19·5 cents. per 1000 cub.m.
3·9d. per 1000 cub.m.
0·11d. ,, 1000 c.ft.

It is obvious from this table that, when gas production increases, with consequent increase in duty for the gas drying plant, the operating costs will be considerably lower, as, of the Fl. 37.47 per day, 24.65 is fixed charges.

The plant has not worked sufficiently long to warrant an opinion on the decrease of stoppages and complaints, but perhaps the coming winter will provide evidence on this point.

Sampling and Analysis of Coal for Export

The British Engineering Standards Association have issued a British Standard Specification for the Sampling and Analysis of Coal for Export Purposes (No. 404-1930). At the same time a Report by Dr. E. S. Grummell and Dr. A. C. Dunningham, of Imperial Chemical Industries, Ltd., on the Sampling of Small Fuel up to 3 in. (No. 403-1930) has also been issued, because this report embodies some general principles of sampling, the explanations in regard to which are important, as they supply the justification for the, comparatively speaking, small samples required in the Export Specification. Without this report many would doubtless criticize the Export Specification somewhat seriously, but it is felt that, if they will only read the report carefully, they will be bound to come to the same conclusions as have been arrived at by the members of the Committee themselves.

In November, 1927, at the invitation of the Department of Scientific and Industrial Research, this work was taken up by the Association. Since that date fully representative Committees, upon which users, coal owners, exporters, and those interested in the scientific side of the problem have been actively engaged in thrashing out this difficult question. The Fuel Research Board unreservedly placed at the disposal of these Committees their report on the Methods of Analysis which they had used for the coal survey of the country, together with all the details of experimental work which had been carried out under their supervision for some years past. It will be realized that the question of sampling presented the most difficulties, particularly on account of the economic situtation.

In the early states an endeavour was made to base the proposals on the theory of size-weight ratio, which was first put forward by Mr. E. G. Bailey, in the "Journal of Industrial and Engineering Chemistry," in 1909. As originally formulated, Bailey's theory stated that the errors to be incurred were a function of the ratio between the weight of the largest particles of impurity and the weight of the sample itself.

So far as accuracy is concerned, the Specification has been drawn up to assure that the ash content of the sample should be within ± 1 unit of the true ash content of the coal sampled. This led, in the preliminary proposals, to the inclusion of a very large minimum gross sample—so large, indeed, as to be unworkable in the export trade.

In order to overcome this very practical difficulty, it was agreed to put forward two Specifications, one for the export trade, in which the size of the gross sample would be reduced to meet the very real difficulties; the other for home use, in which the size of the gross sample would more nearly approximate to the size called for by the gas companies and industrial users.

In the Export Specifications the sizes of gross samples suggested were, first of all, proportionate to the size of the consignment, the actual size being covered largely by the conditions at the exporting ports. These proposals were widely circulated to purchasers of British coal all over the world. They were somewhat severely criticized by Continental importers on the grounds that the sizes of gross samples specified were not sufficient to be representative of any consignment.

About this time Dr. Grummell and Dr. Dunningham produced a report on the sampling of small coal based on some years of investigation. In their report they re-examined Bailey's original data, and, by a different reasoning, came to conclusions which indicated that much smaller weights of samples could be taken than had been recommended in the earlier paper. They proceeded to introduce certain modifications to Bailey's original theory and brought forward the relative degree of purity of the fuel (expressed as "average error" of the fuel) as a factor of primary importance in the theory of sampling. They showed that the "average error" was characteristic of the fuel, and that for any particular fuel it was a surprisingly constant quantity applicable not only to consignments, but to individual wagons, and, moreover, appearing to bear a definite relationship to the total ash content. Their investigation proved, on theoretical grounds, the vitally important fact that it is not necessary to specify the very large samples deemed desirable according to Bailey's original work.

Experimental investigations of this theory have been carried out under the guidance of the Committee, and, as they corroborated the theory advanced, this theory has been adopted as a basis for the Sampling Section of the Export Specification and the Specification for Home Purposes, which is now nearly completed.

The Committee unanimously agreed that this report, which has had such a very important bearing on their discussion, should be issued at the same time as the Specification, so that the widest publicity might be given to the reasons which led the Committee to put forward ther present proposals.

As regards the Methods of Analysis, they are the simple practical ones used in sound commercial practice at the present

time. These have naturally not presented the same difficulties as the problem of sampling. At an early stage it was decided that the methods included should be those used day by day, so that the British Standard Specification would be easy of application to present day trading conditions both at home and abroad.

Alternative methods are included for moisture, volatile matter, and sulphur, and a recommendation is incorporated that the analysis shall be reported on the air-dry coal.

The question of the sampling of coal larger than 3 in. and run-of-mine coal is under investigation. A Committee is actively at work dealing with the matter, and at the present moment a comprehensive series of tests are being carried out by the Fuel Research Board, Collieries, Railways, Power Stations, and Gas Companies throughout the country, in order to obtain the necessary experimental data on which to base a British Standard Specification.

Committees are also engaged in preparing British Standard Methods for the Determination of the Fusion Temperature of Coal Ash and the Agglutinating Value of Coal; and it is expected that these will shortly be available.

In addition, Committees, working in close co-operation with the various Coke Research Committees throughout the country, are dealing with the question of the Sampling and Analysis of Coke.

Another mattter which is under consideration at the present time is the question of the nomenclature of sizing of coal and coke. It will be remembered that in 1927 the Coal Cleaning Conference at Edinburgh passed a recommendation to the Association that a Committee be set up to deal with this matter. It has not been possible to put this work in hand until the present time as the Committees have been fully occupied with the other questions already referred to. A conference will, however, be held in the near future to consider the desirability of the work being proceeded with.

The present issue of the Export Specification and the Report on the Sampling of Small Fuel is in English only, but both French and German translations are being prepared to facilitate their comprehension in the different countries to which British coal is exported.

Copies of the Specification (Sampling and Analysis of Coal for Export, No. 404-1930) and of the Report by Dr. Dunningham and Dr. Grummell (No. 403-1930) may be obtained from the British Engineering Standards Association, Publications Department, 28, Victoria Street, London, S.W. 1., price 2s. 2d. each, post free.

Water Pollution Research.

Summary of Current Literature.

The publication of the Monthly Summaries of Current Scientific and Technical Literature dealing with Water Supplies, Sewage, Trade Waste Waters, River Pollution, and relevant subjects, prepared by the Department of Scientific and Industrial Research, was commenced with the issue of Volume III., No. 1, for January, 1930. During 1930 the monthly numbers constituting Volume III. included more than 1400 abstracts of articles and patent specifications which appeared in a large number of British and foreign scientific and technical journals, together with subject and author indexes. The Summaries have proved of great value to those interested in the subjects not only in this country but in many other parts of the world. They purport as far as possible to render reference to the original articles unnecessary.

The section on Water Supplies includes abstracts of the more important articles on the quality and methods of treatment of water, not only for domestic purposes, but also for the requirements of various industries and of boiler installations. This section is followed by a section on the Analysis and Examination of Water.

The abstracts are classified under the following main headings: Water Supplies; Analysis and Examination of Water; Sewage; Trade Waste Waters; Pollution of Natural Waters; and Miscellaneous.

The subscription rate for the series of twelve monthly issues, including indexes, is 15s. net, post free. Single copies may be obtained, price 1s. 3d. net (1s. 4d., post free). The publication is obtainable from H.M. Stationery Office, Adastral House, Kingsway, W.C. 2.

THE COOKERY AND FOOD EXHIBITION
NEW HALL, OLYMPIA.
January 14th—24th, 1931.

HOT WATER.

A Potterton installation with "VICTOR" Automatic Thermal Storage apparatus yields an abundant supply of hot water with the greatest flexibility whenever the demand occurs, and at other times, both day and night, maintains the water HOT with a consumption of 1·7 cu. ft. gas per hour—less than 2d. per day.

A working exhibit is available for your inspection at Stand No. 32, Ground Floor.

This illustration shows the Latest in Thermal Storage, cellulose enamelled.

THOMAS POTTERTON (HEATING ENGINEERS) LTD.
Cavendish Works, Ravenswood Road, Balham, London, S.W. 12.
Telephone: Streatham 2052/3. Telegrams: Potterton, Bal, London.

University of Leeds

Department of Coal Gas and Fuel Industries with Metallurgy. Programme of Special Courses for Session 1930-31.

In connection with the work of the Department, arrangements have been made for the delivery, during the second term of the session, of the following special courses of evening lectures.

I.—Furnaces and the Utilization of Fuel.

Prof. Cobb.

A series of six lectures on this subject will be given by Prof. Cobb on Tuesdays at 6 p.m. and 7.30 p.m. during the second term, commencing Jan. 27 and concluding Feb. 10, 1931.

SYLLABUS.

1. First principles and the management of heat and temperature. 2. Combustion in air or steam. 3. Gas producer practice. 4. Furnaces in general, and heat efficiency. 5. Firing with coal, gas, oil, and pulverized fuel, boiler furnaces. 6. Recuperative and regenerative furnaces, glass furnaces, metal heating furnaces, &c.

Fee for the Course, 12s. 6d.

II.—Principles of Gas Distribution.

Mr. Lacey.

A series of six lectures will be given by Mr. Stephen Lacey, B.Sc., Distributing Engineer, Gas Light and Coke Company, on Tuesdays, at 6 p.m. and 7.30 p.m., commencing Feb. 17 and concluding March 3, 1931.

SYLLABUS.

1. Function and lay-out of distributing systems. 2. Mains and main laying. 3. Load factor. 4. Allowable loss of pressure. 5. Flow of gas in pipes. 6. Pressure control and measurement of gas. 7. Maintenance of underground plant and its adaptation to meet new conditions. 8. High-pressure distribution and pumping costs. 9. Economics of long-distance transmission.

Fee for the Course, 12s. 6d.

III.—Bye-Product Coking Processes

(including the utilization of Coke Oven Gas for Public Supply).

Mr. Finn.

A course of eight lectures by Mr. C. P. Finn, M.Sc., F.I.C., M.I.Chem.E., Coke Oven Manager, Manvers Main Collieries Company, will be given on Wednesdays, at 6 p.m. and 7.30 p.m., commencing Wednesday, Feb. 18, and concluding on March 11, 1931.

SYLLABUS.

Preparation of coals for the coking process. Description of the development of bye-product coking with its accessory processes. Manufacture of sulphate and chloride of ammonia, concentrated ammonia liquor, the recovery of benzene and toluene, cyanogen, and sulphuretted hydrogen, tar distillation. The utilization of coke oven gas for the public supply of heat, power, and light. Technical discussion of the various types of modern coking installations. The control of such plants and the examination of coals.

Fee for the Course, 15s.

IV.—Gas Appliances and Their Products of Combustion.

Mr. Wood.

Two lectures will be given by Mr. J. W. Wood, M.Sc., A.I.C., Research Chemist, Joint Research Committee of the Institution of Gas Engineers and the University of Leeds, at 6 p.m. and 7.30 p.m., on Wednesday, Feb. 11, 1931.

SYLLABUS.

Fuel gases, their air requirement, and the nature and amount of the corresponding products of combustion. Water vapour, conditions under which condensation occurs, effects of deposition and means of avoiding same. Sulphur compounds. Carbon monoxide, its determination and effects; the amounts produced by gas flames of different kinds, and the important influence of construction of appliances and their mode of operation. Illustration with typical gas appliances—*e.g.*, ring-burners, ovens, geysers, gas fires, and lighting burners. Ventilation and the removal of products of combustion.

Fee for the Course, 5s.

V.—Metallurgy.

Mr. Summers.

A course of six lectures on the microscopic study of engineering alloys, followed by practical work in the laboratory, will be given by Mr. P. F. Summers, A.R.S.M., on Wednesdays, at 6 p.m., commencing Jan. 14, and concluding Feb. 18, 1931. The course will be divided into two parts, which may be taken separately, though all intending students are expected to enrol on Jan. 14.

Part 1.—General (three lectures with laboratory work): An introduction to the metallographic study of metals and alloys, their preparation and examination. The composition and uses of various engineering alloys.

Part 2.—Special (three lectures with laboratory work): The microstructure and other properties of certain engineering alloys, selected to meet the needs of the class.

Fee for each part (including laboratory work), 7s. 6d.

VI.—Evening Laboratory Course.

Prof. Cobb, Mr. Hodsman, and Mr. Summers.

The laboratory of the Department will be open on Wednesday evenings between 6 p.m. and 9 p.m. from Jan. 14 to Feb. 18, 1931, for a limited number of students who have already received some chemical training, but who desire instruction in fuel calorimetry and pyrometry. More advanced students, capable of independent work, may also be admitted to the laboratory during these periods.

The earliest possible application from intending students is requested.

Fee, 15s.

Parliamentary Bills for 1931

Summary of the Main Provisions of Private Bills Affecting Gas to be Considered in the Forthcoming Session

Aldershot Gas, Water, and District Lighting Bill.

The objects are to extend the limits of the Aldershot Gas, Water, and District Lighting Company for the supply of gas to include parts of the parishes of Compton and Godalming Rural. The powers of the Godalming Gas and Coke Company for the supply of gas in this area will be terminated. The name of the Company is to be changed to the Southern Utility Company. Provision is made for the issue of any new ordinary or preference stock (1) to consumers and employees at average market prices; (2) by public auction or tender; (3) if unsold, to existing stockholders, employees, or consumers at a reserve price. Power is sought to enter into agreements with other statutory gas undertakings for amalgamation, purchase, leasing, or joint working; and authority to acquire and hold the securities of other companies engaged in allied industries.

[*Parliamentary Agents: Messrs. Blyth, Dutton, Hartley, & Blyth.*]

Gas Light and Coke Company.

The Bill is to authorize the transfer on Jan. 1, 1932, to the Gas Light and Coke Company of the Southend-on-Sea and District Gas Company and the Brentwood Gas Company; the exchange of stock to be on the following basis:

Differential prices for gas may be charged as follows:

Southend Company Stock.	*Gas Light Company Stock.*
£100 original consolidated or new ordinary stock.	£130 ordinary stock, *plus* £7 13s. cash.
£100 new ordinary "B" stock.	£123 6s. 8d. ordinary stock, *plus* £7 5s. 6d. cash.
£100 5½ p.ct. irredeemable preference stock.	£137 10s. 4 p.ct. consolidated preference stock.
£100 6 p.ct. irredeemable preference stock.	£150 4 p.ct. consolidated preference stock.
£100 5 p.ct. perpetual debenture stock.	£166 13s. 4d. 3 p.ct. consolidated debenture stock.
£100 4 p.ct. perpetual debenture stock.	£133 6s. 8d. 3 p.ct. consolidated debenture stock.
Brentwood Company Stock.	*Gas Light Company Stock.*
£100 original stock.	£152 ordinary stock.
£100 additional stock.	£106 8s. ordinary stock.
£100 6 p.ct. preference stock.	£125 4 p.ct. consolidated preference stock.
£100 6 p.ct. redeemable preference stock.	£100 6 p.ct. redeemable preference stock.
£100 5½ p.ct. debenture stock.	£183 6s. 8d. 3 p.ct. consolidated debenture stock.

The 6 p.ct. redeemable preference stock issued in exchange for

similar Brentwood stock is redeemable in cash at par on Jan. 1, 1933.

Differential prices for gas may be charged not exceeding the following amounts:

In the main part of the Southend district, 2d. per therm more than the price charged to private consumers North of the Thames.

In the rural district of Rochford (except the parish of Sutton), 3·6d. per therm more than the price charged in the main part of the Southend district.

In the main part of the Brentwood district, 4·65d. per therm more than the price charged to private consumers North of the Thames.

In the parishes of Ingatestone and Fryerning, and part of the parish of Mountnessing, an additional 2d. per therm to May 20, 1936, 1d. per therm to May 20, 1941, and 0·6d. per therm thereafter.

Directors of the Southend and Brentwood Companies are to receive compensation for loss of office on the basis of seven years' remuneration; Auditors are to receive three years' remuneration. Officers of the two Companies who are not taken over are to receive compensation to be fixed by agreement, or in default by the President of the Institute of Chartered Accountants. As regards employees, the National Joint Council scheme of May, 1930, shall apply.

Part III. of the Bill fixes the basis price of gas supplied by the Gas Light Company at 11d. per therm, subject to the continuance of the existing prescribed difference in differential price areas. The basic rate of dividend is fixed at 5 p.ct. on the ordinary stock. Provision is made for the revision of the basic price. Part IV. empowers the Company to borrow on mortgage or to issue debenture stock to an amount not exceeding in all 60 p.ct. of the aggregate nominal capital issued, and premiums.

[*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

Guildford Gas and Electricity.

To empower the transfer to the Guildford Gas Light and Coke Company of the undertaking of the Cranleigh Gas and Electricity Company, Ltd., on the following terms:

For each original, additional, or new ordinary £10 Cranleigh share £10 consolidated ordinary stock and £2 6 p.ct. preference stock.

For each £10 electricity ordinary share, £10 ordinary stock and £2 6 p.ct. preference stock.

For each £50 5 p.ct. mortgage debenture, £50 5 p.ct. debenture stock.

The Guildford Company are to be authorized to charge within the Cranleigh district a price exceeding by not more than 4d. per therm the price charged in the Borough of Guildford, but this price shall not be taken into account in determining the rates of dividend under the sliding scale. The calorific value of gas supplied in the Cranleigh district shall continue unchanged. Provision is made for compensation to the Directors of the Cranleigh Company on the basis of seven times the fees received during 1929; to the Auditors on the basis of three times the annual remuneration; to the Secretary on the basis of seven times his salary, fees, and emoluments for 1929; and to the other staff officers of the Cranleigh Company not taken over an amount to be determined by agreement or in default by arbitration.

The authorized capital of the Guildford Company is increased in respect of the gas undertaking by £20,000 consolidated ordinary stock and £4000 of 6 p.ct. preference stock, and in respect of the electricity undertaking by £10,000 electricity ordinary stock and £2000 of 6 p.ct. preference stock, with borrowing powers up to a limit of 60 p.ct. of the paid-up capital. Separate accounts are to be kept in respect of the gas and electricity undertakings. Dividends on existing preference stock are limited to 5 p.ct. Dividends on existing consolidated ordinary stock and on the additional consolidated stock created under the Act are to be at the standard rate of 5 p.ct., subject to the sliding-scale. The Company are empowered during the first five years from the date of transfer to appropriate a portion of the divisible gas profits for division among the holders of electricity stock in order to bring their dividends up to the rate payable in respect of ordinary and preference stock.

[*Parliamentary Agents: Messrs. Sherwood & Co.*]

(To be concluded.)

REGISTER OF PATENTS

Thermostatically Controlled Gas Valves. No. 339,169.

Radiation, Ltd., of Birmingham, Yates, H. J., of 15, Grosvenor Place, S.W. 1, and Howlett, M., & Co., Ltd., of Birmingham.

No. 1832; Jan. 18, 1930.

The invention comprises the combination of a slidable stem carrying a pair of disc valves (one of which controls the gas supply while the other prevents leakage of gas past the stem), a slidable stem which is acted on by a bi-metal or other thermostatic element, and a spring toggle mechanism interconnecting the two stems. The arrangement is such that the initial part of the required movement of the valve is effected by the thermostatic element and the final part of the movement by the spring toggle mechanism.

Also the invention comprises the combination, with either stem, of a hand operated cam device which serves to effect a partial opening of the valve and which automatically becomes inoperative after the thermostatic element has come into action.

Fig. 1 is a part sectional side elevation of a gas burner provided with a control device constructed in accordance with the invention; and fig. 2 is a sectional side view.

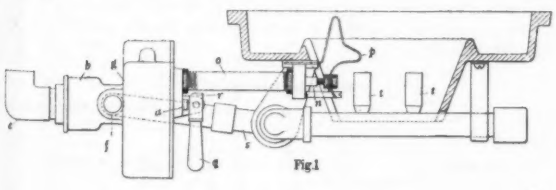


Fig.1

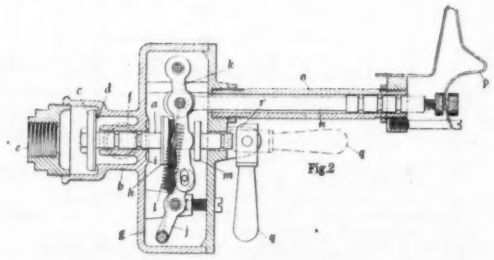


Fig.2

Thermostatically Controlled Gas Valve.

A slidable stem *a* is carried in a valve box *b*. On one end of the stem a disc valve *c* is provided. This co-operates with an annular seating *d*, and serves to control the flow of gas from the inlet *e* to the outlet *f* of the valve box. Alongside the valve box *b* is arranged another box *g* containing the toggle mechanism, and on the portion of the valve stem in this box is provided another disc valve *h* which, by co-operating with a seating *i* on the face of the box through which the stem passes, serves to prevent leakage of gas from the valve box when the valve is open.

The toggle mechanism comprises a pair of pivoted elements *j*, *k*, which are interconnected to form a toggle, and a spring or pair of springs *l* which tend to hold the mechanism in either of its two limits of movement. The valve stem *a* engages (by means of the outer side of the valve *h*, and a collar *m*) the element *k*, and to the same element is attached one end of a stem *n* which slides through a tubular extension *o* at one side of the box *g* containing the toggle mechanism. To the outer end of this stem is connected a bi-metal thermostatic strip *p*. At one end the strip is attached to the said tubular extension *o* and at the other end to the stem *n*. The strip is bent to a suitable form, enabling an adequate length of strip to be contained in a comparatively small compass and at the same time affording adequate axial movement of the stem when the strip is heated by the action of a gas flame.

To enable the valve to be opened by hand, the portion of the valve stem *a* which extends through the box *g* is arranged to project through one side of the box; and adjacent to its outer end is pivoted on the box a finger lever *q* having a cam like end *r*. On moving the lever about its pivot to the dotted line position (fig. 2) sufficient endwise movement is given to the stem *a* to effect a suitable opening of the gas valve for lighting. Gas can then pass through the outlet *f*, along a pipe *s* to the burner or burners *t*, and the flame of the burner or one of the burners is caused to impinge on the thermostatic element *p*. Under the action of the heat the latter imparts a further opening movement to the valve *c* and by carrying the valve stem *a* clear of the cam on the finger piece *q* releases the latter so that it can move under the action of gravity or a spring to its original unobstructive position (*e.g.*, the position shown in figs. 1 and 2) where it cannot interfere with the subsequent proper closing of the valve.

During the opening of the valve either by the finger lever or the thermostatic element, the toggle mechanism approaches its central position, and in this movement the spring or each spring is stressed. After the mechanism has passed its central position the movement is completed rapidly by the spring or springs. This action is of special importance during the closing of the valve, for in the event of interruption of the gas supply, and the consequent cooling of the thermostatic element, the latter first effects a partial movement of the toggle mechanism until the spring can take control, and then the movement is completed quickly and definitely by the spring.

Storage Water Heater.—No. 339,233.

Burt, A. & T., Ltd., of Dunedin, N.Z.

No. 14,611; May 12, 1930. Convention date, May 25, 1929.

This invention relates to a gas-heated water system by means of which a body of water contained within a storage tank may be heated by connection in a convection circulatory system with a heater unit. The invention embodies the combination of such heater unit in a system in which the storage tank, and a supply cistern therefor, are employed, and in which provision is made for thermostatic control, and also for the circulation through the system being controlled.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

Most markets on the Stock Exchange remained listless during the four days of business last week. The one bright spot was the gilt-edged section; and prices of British Funds showed an all-round rise on Friday when news was received that the Bank of France had reduced its discount rate to 2 p.ct.

The volume of business in Gas Stocks and Shares was comparatively small, but prices on the whole maintained the previous week's level. The feature of the week was a sharp rise of 7½ points to 120-130 in Sutton ordinary stock. This Company has recently notified its proprietors of a provisional agreement for the amalgamation of the Company with the Wandsworth, Wimbledon, and Epsom District Company. The agreement, which is subject to the approval of the proprietors of both Companies and to a Special Order by the Board of Trade, provides, *inter alia*, for the issue of £165 Wandsworth 5 p.ct. preference stock for each £100 Sutton ordinary stock, and £100 Wandsworth 5 p.ct. debenture stock for each £100 Sutton 5 p.ct. debenture stock. The terms also include a reduction in the price of gas to consumers in the Sutton Company's area of supply. If the proposals are approved, the present holders of Sutton ordinary stock will have received generous terms both as regards capital appreciation and dividend. The present market value of £165 Wandsworth 5 p.ct. preference stock is £159 4s. 6d., against a value of £117 10s., prior to the notification, for £100 Sutton ordinary; while the dividend on the former is a clear 8¼ p.ct., against a yield on the latter at the current price of £6 8s. p.ct. The Sutton Company distributed 8 p.ct. on the ordinary capital for the three years 1927 to 1929, and there is every prospect of this rate being maintained for 1930.

In accordance with the practice of the past few years, the prices of the lowest and highest transactions during the past year have been inserted in the Stock and Share List. Comparing these figures with those published for 1929, it is gratifying to note that, with few exceptions, the highest prices are at or about the current market quotations, whereas the position was reversed last year.

New Capital Issues.

Weymouth Consumers' Gas Company.—The Directors of the Weymouth Consumers' Gas Company are prepared to receive on or before Jan. 19, 1931, sealed tenders for an issue of £31,823 5½ p.ct. redeemable preference stock, redeemable at par on Dec. 31, 1955. The stock may be tendered for in amounts of £10 or upwards in multiples of £1, no tender to be considered at less price than par. A deposit of 10 p.ct. of the nominal amount of the stock tendered for must accompany the tender.

Contracts Advertised To-Day.

Tar Dehydration Plant, &c.

The Clonmel Corporation invite tenders for a tar dehydration and bitumen mixing plant. [Advert. on p. 52.]

Pipes and Specials.

The Gas Department of the Sidmouth Urban District Council invite tenders for the supply of mains and specials. [Advert. on p. 52.]

Trade Notes.

Glassware for the Fair.

A number of leaflets and an explanatory letter are being circulated by Messrs. Hailwood & Ackroyd, Ltd., of Morley, near Leeds, to prospective exhibitors at the forthcoming British Industries Fair at London and Birmingham, showing the suitability of the firm's glassware products for stand fittings. A very wide range of beautiful and useful glassware for both domestic and trade purposes is illustrated in the leaflets, and the firm urge exhibitors to insist upon their stands being equipped with English globes and shades.

Staveley Sand Spun Pipes.

A plant is now nearing completion in this country for the production of cast-iron pipes by the Sand Spun Pipe Corporation Process, the sole patent rights for this country being held by the Staveley Coal and Iron Company, Ltd., of Chesterfield, who anticipate having the new product on the market in the near future. The Company have recently issued a booklet explaining this centrifugal method of casting iron pipes in sand moulds. The sand spun pipe, they state, will be made in lengths of 16 ft., which will give a 25 p.ct. saving to users in caulking and jointing, while saving a considerable weight in iron by the reduced number of sockets used in a pipe line. It is intended to commence manufacture on 4 in. up to 12 in. diameter pipes, passing on to larger sizes as occasion demands.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 5.

There is no change in the values of tar products, which remain as follows:

Pitch, 45s. per ton f.o.b.

Creosote, for export, 5⅝d. to 6d. per gallon f.o.b.

Pure toluole, about 2s. per gallon; pure benzole, about 1s. 8d. per gallon; 95/160 solvent naphtha, about 1s. 5d. per gallon; pyridine bases, about 3s. 9d. per gallon.

All prices of spirits are *ex* sellers' works.

Tar Products in the Provinces.

Jan. 5.

The average prices of gas-works products during the week were: Gas-works tar, 19s. 3d. to 23s. 3d. Pitch—East Coast, 44s. to 45s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 44s. to 45s. f.o.b.* Toluole, naked, North, 1s. 6⅜d. to 1s. 7½d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 2½d. to 1s. 3d. Heavy naphtha, North, 11d. to 1s. Creosote, in bulk, North, liquid and salty, 3½d. to 3⅝d.; low gravity, 1½d.; Scotland, 3½d. to 3⅝d. Heavy oils, in bulk, North, 5½d. to 6d. Carbolic acid, 60's, 1s. 2d. to 1s. 2½d. Naphthalene, £10 to £12. Salts, £3 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Jan.* 3.

Little or no business has been transacted during the week owing to the holidays. Stocks continue high with prices easy.

Pitch.—Orders are scarce, and prices are nominal at 42s. 6d. to 45s. per ton f.o.b. Glasgow for export, and about 42s. 6d. per ton f.o.r. works for home trade.

Refined tar to Ministry of Transport Specification is being offered freely at to-day's quotations of 2⅝d. to 3d. per gallon f.o.r. works in buyers' packages.

Creosote.—Orders are less frequent, but quotations remain unchanged. B.E.S.A. Specification is 2⅝d. to 3¼d. per gallon; low gravity, 3d. to 3⅛d. per gallon; and neutral oil, 3d. to 3¼d. per gallon—all f.o.r. makers' works in bulk.

Cresylic.—This market is dull with values weak. Pale, 97/99 p.ct., is 1s. 6d. to 1s. 7d. per gallon; dark, 97/99 p.ct., 1s. 5d. to 1s. 6d. per gallon; and pale, 90/100 p.ct., 1s. 8d. to 1s. 9d. per gallon—all f.o.r. naked.

Crude naphtha.—Makers' quotations are steady at 4d. to 4½d. per gallon *ex* works in bulk.

Solvent naphtha.—The position is unchanged, with 90/160 at 1s. 2½d. to 1s. 3d. per gallon, and 90/190 at 1s. to 1s. 0½d. per gallon.

Motor benzole.—Makers have an accumulation of stocks, and value is slightly lower at 1s. 4d. per gallon f.o.r. in rail cars.

Pyridines.—Prices continue nominal, with 90/160 about 3s. to 3s. 3d. per gallon.

Benzole Prices.

The following are considered to be the market prices at the present time:

	s. d.		s. d.	
Crude benzole	0 7½	to	0 8½	per gallon at works
Motor ,,	1 3	,,	1 4	,, ,, ,,
Pure ,,	1 7½	,,	1 8½	,, ,, ,,

Diaries, Calendars, &c., Received.

Acknowledgment is made of the receipt from the following friends of seasonable gifts in the form of diaries, calendars, &c.:

"B.C.G.A." Gas Salesmen's Circle, Manchester District, West Riding of Yorkshire Section.
Ashmore, Benson, Pease, & Co., Ltd., Stockton-on-Tees.
Beebee & Evans, 139, Cannon Street, London, E.C.
A. Borsig G.M.B.H., Berlin-Tegel.
British Jeffrey-Diamond, Ltd., Wakefield.
Chemical Trade Journal, 265, Strand, London, W.C.
A. L. Curtis, Westmoor Laboratory, Chatteris.
Davison & Partner, Ltd., 11, Carteret Street, Westminster, S.W.
Dougall's Gas Meters, Ltd., Chiswick Mall, London, W.
Gas Light and Coke Company's Co-Partners' Calendar.
Peckett & Sons, Ltd., Bristol.
Simon-Carves, Ltd., 20, Mount Street, Manchester.
South Metropolitan Gas Company's Co-Partnership Almanack.

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Jan. 2.	Rise or Fall on Week.	Transact'ns Lowest and Highest Prices During the Year, 1930.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C.	73—78	..	74—76
522,992	,,	,,	4	4	Do. 4 p.c. Pref.	73—76	..	70—74½
1,551,868	,,	Oct. 9	7⅞	7⅞	Alliance & Dublin Ord.	100—105	..	92½—104½
374,000	,,	July 10	4	4	Do. 4 p.c. Deb.	72—77	..	61—75
522,655	,,	Aug. 28	7	7	Barnet Ord. 7 p.c.	108—111	..	107½—115
300,000	1	Oct. 23	1/4⅛	1/7⅛	Bombay, Ltd.	15/6—17/6	..	16/—18/-
174,500	10	Aug. 14	9	9	Bournemouth 5 p.c.	14½—15½	+½	13—15
500,050	10	,,	7	7	Do. B 7 p.c.	12½—13	..	12⅝—12⅞
439,160	10	,,	6	6	Do. Pref. 6 p.c.	11—11¼	..	10⅞—11⅞
50,000	Stk.	Dec. 18	3	3	Do. 3 p.c. Deb.	57—60*	..	55—58
182,025	,,	,,	4	4	Do. 4 p.c. Deb.	75—78*	..	73—75
357,900	,,	Aug. 28	7½	7½	Brighton & Hove 6 p.c. Con.	112—117	..	112½—119½
371,880	,,	,,	6½	6½	Do. 5 p.c. Con.	102—105	..	100—104¾
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max.	93—95a	+½	.. h
855,000	,,	Sept. 25	8	7	British Ord.	108—113	..	111—115
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	109—114*	..	112—117
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	74—77*	..	70—77
450 000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	95—98*	..	93—95½
100,000	,,	June 26	5	5	Cambridge 5 p.c. Deb.	97—100	..	94—96½
100,000	10	Dec. 4	10	6	Cape Town, Ltd.	8½—9½	..	8½—9½
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref.	6½—7½	..	6½—7½
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb.	70—75*	..	72½—76
626,850	,,	July 24	6	6	Cardiff Con. Ord.	95—98	..	96½—97½
287,850	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	99—102	..	..
157,150	,,	Aug. 14	6½	5	Chester 5 p.c. Ord.	86—91b	..	89—93b
96,986	1	Oct. 9	†2/-	†2/-	Colombo, Ltd. Ord.	32/—34/-	..	33/—33/6
24,500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	18/—20/-	..	18/3—18/7½
609,204	1	Oct. 9	1/9½	1/4½	Colonial Gas Assn. Ld. Ord	16/6—18/6	..	17/- 24/-
296,053	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	18/—20/-	..	19/6—21/-
2,078,280	Stk.	July 24	7	6	Commercial Ord.	95—98	..	87—97½
475,000	,,	D c. 18	3	3	Do. 3 p.c. Deb.	57—60*	..	54½—61
787,560	,,	Aug. 14	7	7	Croydon sliding scale	106—109	..	102½—108½
453,100	,,	,,	5	5	Do. max. div.	83—86	..	80—86
542,270	,,	Aug. 14	10	7	Derby Con.	115—125e	..	.. h
55,000	,,	Dec. 18	4	4	Do. Deb.	65—70e*	..	.. h
209,000	,,	Aug. 28	5	5	East Hull Ord. 5 p.c.	72—75	..	71½ 74½
1,002,180	,,	Sept. 25	†7g	14	European, Ltd.	95—105	—5	95—115½
18,629,125	,,	July 24	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	19/6—20/-f	..	17/—20/3
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	63½—65½	..	60⅝—65½
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	79—83	..	74½—82
5,502,620	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb.	60—63*	..	56½—64
5,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	99—102*	..	98—103
161,480	,,	Sept. 11	10	10	Harrogate Cons. 10 p.c. max.	155—160	..	150
82,500	,,	Aug. 28	7	7	Hastings & St. L. 5 p.c. Conv.	98—103	..	98—103½
258,740	,,	,,	5½	5½	Do. 5½p.c. Con v.	79—84	..	78—83½
70,000	10	Oct. 9	‖	10	Hongkong & China, Ltd.	13—14	..	13⅜—14 5/16
213,200	Stk.	Aug. 14	6	6	Hornsey Con. 5½ p.c.	88—91	..	90—93
2,436,594	,,	Nov. 6	25	15	Imperial Continental Cap.	835—855	..	380—418
223,130	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	80—85	..	72—85
235,242	,,	Aug. 14	8½	8½	Lea Bridge 5 p.c. Ord.	125—130	+2	114—126½
2,145,907	,,	Aug. 14	6	6	Liverpool 5 p.c. Ord.	96—97b	..	88½—96⅞b
600,000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref.	99—101b	..	100 101b
165,736	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap.	123—128	..	119½—126
63,480	,,	Dec. 18	3	3	Do. 3 p.c. Deb.	54—57*	..	..
75,000	5	Dec. 4	†10	†10	Malta & Mediterranean	5¼—5⅞	..	5⅜—5⅞
392,000	—	Oct. 1	5½	5½	Melrp'itan (of Melbourne) 5½ p.c. Red. Deb.	88—91	..	..
675,000	Stk.	Nov. 20	†8	†6	Montevideo, Ltd.	100—110	..	100— 111
2,051,315	,,	July 24	5½	5	Newcastle & Gateshead Con.	16/9—17/3d/	..	.. h
682,856	,,	,,	4	4	Do. 4 p.c. Pref.	72—73d	..	.. h
691,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	66½—67½d	..	.. h
169,940	,,	Aug. 28	7¼	7¼	North Middlesex 6 p.c. Con.	115—120	..	109—117½
396,160	,,	Aug. 14	5	5	Northampton 5 p.c. max.	76—81	..	74½ 81
300,000	,,	Nov. 20	7	9	Oriental, Ltd.	104—109	..	105—113
60,000	5	13 My., '15	—	—	Ottoman	0—¼	..	1/— 2/6
205,162	Stk.	Dec. 18	8	8	Plym'th & Stonehouse 5 p.c.	107 112*	..	..
424,416	,,	Aug. 28	8	8	Portsm'th Con. Stk. 4 p.c. Htd	115—120	..	112—116
241,446	,,	,,	5	5	Do. 5 p.c. max.	80—83	..	78—82
186,000	100	Dec. 1	4	4	Primitiva 4 p.c. Red. Deb.	—	..	93—98½
677,887	Stk.	July 24	4	4	Do. 4 p.c. Red. Deb. 1911	83—86	..	79—85
371,496	,,	Dec. 18	4	4	Do. 4 p.c. Cons. Deb.	83—86*	..	78½—86½
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref.	8¼—8¾	..	8⅜—9 1/16
1,736,968	Stk.	Aug. 28	6½	6½	Sheffield Cons.	105—107e	..	.. h
95,000	,,	July 10	4	4	Do. 4 p.c. Deb.	76—78e	..	.. h
90,000	10	June 5	†4	†5	South African	4—6	..	4⅞—5⅜
6,709,895	Stk.	Aug. 14	7½	5	South Met. Ord.	104—108	..	97—106½
1,185,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	112—115	..	106½—114½
1,895,445	,,	July 10	3	3	Do. 3 p.c. Deb.	60—63	..	54½—62½
734,000	,,	Sept. 11	6½	6½	Do. 6½ p.c. Red. Db.	99—102	..	98½—101⅝
91,500	,,	Aug. 14	8½	8½	South Shields Con.	108—110d	..	.. h
1,543,795	,,	July 24	6¾	6¾	South Suburban Ord. 5 p.c.	102—105	..	98—105
468,827	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	98—101*	..	93 101½
647,740	,,	Aug. 28	5	5	Southampton Ord. 5 p.c. max.	75—78	..	76½—79½
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	76—78*	..	75
179,014	,,	July 24	8	8	Sutton Ord.	120—130	+7½	114—115½
94,500	,,	June 26	5	5	Do. 5 p.c. Deb.	96—99	..	92—98
250,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref.	98—101	..	98—102½
200,000	,,	Dec. 18	6½	6½	Do. 6½ p.c. Red. Deb.	100—103*	..	99—104½
1,076,490	,,	July 24	6⅝	6⅝	Tottenham District Ord.	103—107	..	100½—106¼
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	98—101	..	96
199,005	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	76—79*	..	71½—79
182,380	10	30 Dec., '12	—	—	Tuscan, Ltd.	2—3	..	2—4
85,701	Stk.	Sept. 25	6	6	Do. 6 p.c. Red. Deb.	74—79	..	74½—77⅞
309,094	,,	Aug. 28	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	95—100	..	96—100½
88,380	,,	,,	5	5	Do. 5 p.c. pref.	88—93	..	85—91½
1,130,970	,,	July 10	—	7	Wandsworth, Wimbledon, and Epsom Cons.	109—114	..	105—112½
300,000	,,	,,	5	5	Do. 5 p.c. Pref.	95—98	..	87½—96
488,344	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	97—100*	..	91½—102

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. f.—The quotation is per £1 of Stock. g.—Paid on £10 shares. h.—Figures unobtainable. * Ex. div. † Paid free of income-tax. ‡ For year. ‖ Div.=10 p.ct. p.a. less tax and less tax on interim dividend.

STOCK ISSUES.

By Order of the Directors.

THE SHERINGHAM GAS AND WATER COMPANY.

Messrs. A. & W. RICHARDS

are Instructed to OFFER FOR SALE BY TENDER

£4000

PREFERENCE STOCK, WATER UNDERTAKING,

entitled to a Dividend of 6 per cent. per annum until the 31st of December, 1935, and 5 per cent. per annum after that date and in perpetuity.

Minimum Price of Issue, £102 per £100. Also

£2166

FIVE PER CENT. PERPETUAL DEBENTURE STOCK GAS UNDERTAKING.

Minimum Price of Issue, £90 per £100.

Prospectus and Form of Tender (which latter must be sent in by 11 o'clock on Thursday, the 15th of January) may be obtained of A. & W. RICHARDS, 37, WALBROOK, E.C. 4.

By Order of the Directors.

EXMOUTH GAS COMPANY.

Issue by Tender of

£12,732 CONSOLIDATED ORDINARY STOCK

(Including premiums).

THE Exmouth Gas Company Offer for SALE BY TENDER, £12,732 CONSOLIDATED ORDINARY STOCK, the minimum price of issue being £115 per £100 stock.

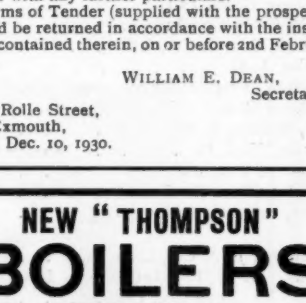
Copies of the Prospectus may be obtained from the Secretary at the offices of the Company, together with any further particulars.

Forms of Tender (supplied with the prospectus) should be returned in accordance with the instructions contained therein, on or before 2nd February, 1931.

WILLIAM E. DEAN,
Secretary.

21, Rolle Street,
Exmouth,
Dec. 10, 1930.

NEW "THOMPSON"
BOILERS
EX STOCK



MOST MODERN "DISH-END" TYPE
WITH CORRUGATED SECTIONS.

	W.P.	Shop No.
One 30 ft. × 9 ft. 3 ins. × 200 lbs.		6948
Two 30 ft. × 9 ft. 3 ins. × 160 lbs.		6848/9
One 30 ft. × 9 ft. 3 ins. × 120 lbs.		7012
Two 30 ft. × 8 ft. 6 ins. × 160 lbs.		6970/1
Two 30 ft. × 8 ft. 6 ins. × 160 lbs.		6988/4
One 30 ft. × 8 ft. 3 ins. × 120 lbs.		6982
One 30 ft. × 7 ft. 6 ins. × 120 lbs.		6945
One 28 ft. × 7 ft. 6 ins. × 160 lbs.		6785
Two 24 ft. × 6 ft. 6 ins. × 150 lbs.		6974/5
One 10 ft. × 4 ft. 0 ins. × 120 lbs.		6443

All the above Boilers are built from "Siemens Martin" Acid Steel.

SUPERHEATERS AND PIPEWORK INSTALLATIONS.

Repairs to all types of Boilers by first-class men.

JOHN THOMPSON
(WOLVERHAMPTON) LTD.,
WOLVERHAMPTON, ENG.

INDEX TO "JOURNAL" ADVERTISERS.

	PAGE
Aerograph Co., Ltd.	—
Alder & Mackay, Ltd.	5
Aldridge & Ranken, Ltd.	—
Allan, Thomas, & Sons, Ltd.	—
Anglo-American Oil Company, Ltd.	58
Arden Hill & Co.	—
Asbestos Cement Building Products, Ltd.	—
Ashmore, Benson, Pease, & Co., Ltd.	11
Bagnall, John, & Sons, Ltd.	—
Bagshawe & Co., Ltd.	—
Bale & Church, Ltd.	51
Barclay, Andrew, Sons, & Co., Ltd.	56
Barrowfield Ironworks, Ltd.	—
Bell's Poilite & Everite Co., Ltd.	—
Berk, F. W., & Co., Ltd.	—
Blakeley (Firth), Sons, & Co., Ltd.	52
Braddock, J. & J.	Wrapper II., 51
Bradley & Burch, Ltd.	—
Bray, George, & Co., Ltd.	—
British Aluminium Co., Ltd.	—
British Fibrocement Works, Ltd.	—
British Furnaces, Ltd.	—
British Gas Purifying Materials Co.	51
British Industries Fair	—
British Thomson-Houston Co., Ltd.	—
Broadbent, Thos., & Son, Ltd.	11
Broadhead Constructions, Ltd.	Wrapper I.
Bugden, T., & Co.	—
Cambridge Instrument Co., Ltd.	—
Cannon Iron Foundries, Ltd.	—
Carron Company	—
Cellactite & British Uralite, Ltd.	—
Chapman (Spencer) & Messel, Ltd.	51
Chemical Engineering and Wilton's Patent Furnace Co., Ltd.	—
Clapham Bros., Ltd.	62
Clarks Stove Co., Ltd.	—
Clayton, Son, & Co., Ltd.	—
Cloake, A. G.	—
Coleman Foundry Equipment Co.	—
Colthrop Board & Paper Mills, Ltd.	—
Cort, Robert, & Son, Ltd.	—
Cowan, W. & B.	Wrapper III.
Crepin & Doumin, Ltd.	—
Crossley Bros. (Bispham)	58
Cutler, Samuel, & Sons, Ltd.	—
Dampney, J., & Co., Ltd.	—
Danks, H. & T. (Netherton), Ltd.	51
Davis Gas Stove Co., Ltd.	—
Davison & Partner, Ltd.	—
Dempster, R. & J., Ltd.	Centre VIII.
Dempster, R., & Sons., Ltd.	Centre II., 52
Donkin Co., Ltd. (The Bryan)	Wrapper II.
Drakes, Ltd.	Centre VI.
Drayton Regulator and Instrument Co., Ltd.	—
Dry Gasholders, Ltd.	6
Duckham, Alexander, & Co., Ltd.	—
Duxbury, Thomas, & Co.	Wrapper I.
Eagle Range and Grate Co.	—
Economic Gas Boiler Co., Ltd.	—
Economical Gas Apparatus Construction Company, Ltd.	52
Eden Fisher & Co., Ltd.	—
Electrolux, Ltd.	—
Evans, Joseph, & Son (Wolverhampton), Ltd.	1
Expanded Metal Company, Ltd.	54
Falk, Stadelmann, & Co., Ltd.	—
Fletcher, Russell, & Co., Ltd.	17
Foster & Pullen, Ltd.	—
Foster Bros., Ltd.	—
Fraser & Chalmers Engineering Works	12
Gas Chambers and Coke Ovens, Ltd.	—
Gas Meter Co., Ltd.	Wrapper IV.
Gas Purification and Chemical Co.	Wrapper I., 51
General Gas Appliances, Ltd.	19
General Refractories, Ltd.	57
Gibbons Bros., Ltd.	—
Gibbons (Dudley), Ltd.	—
Gledhill-Brook Time Recorders	—
Glenboig Union Fireclay Co., Ltd	Wrapper II.
Glover, George, & Co., Ltd.	Wrapper I.
Glover, Thos., & Co., Ltd.	20
Goodall, Clayton, & Co., Ltd.	—
Grant, David, & Co.	—
Green & Boulding, Ltd.	—
Griffiths Bros. & Co. (London), Ltd.	Wrapper I.
Hall, John, & Co., Stourbridge, Ltd.	—
Hardtmuth, L. & C.	—
Harris & Pearson	Wrapper IV.
Head, Wrightson, & Co., Ltd.	60
Holmes, W. C., & Co., Ltd.	53
Holst, K., & Co.	—
Horseley Bridge and Engineering Company, Ltd.	—
Horstmann Gear Company, Ltd.	—
Hortonspheres	—
Humphreys & Glasgow, Ltd.	18
Hurry Water Heater Co.	—
Hutchinson Bros., Ltd.	51
Institute of Chemistry	58
Jenkins, Robert, & Co., Ltd.	5
Jenkins, W. J., & Co., Ltd.	—
Kaye, Joseph, & Sons, Ltd.	—
Keith, James, & Blackman Company, Ltd.	62
Kempton, C. H., & Co., Ltd.	14
King, Walter, Ltd.	54
King's Patent Agency	51
Kinnell, Chas. P., & Co., Ltd.	—
Kirkham, Hulett, & Chandler, Ltd.	13
Kleenoff Co.	51
Koppers Coke Oven Co., Ltd.	61
Lacy-Hulbert & Co., Ltd.	4
Laidlaw, R., & Son (Edin.), Ltd.	—
Le Bas Tube Co., Ltd.	—
Lead Wool Company, Ltd.	—
Lighting Trades Ltd.	8
London Electric Firm, The	Wrapper II.
Macpherson, Donald, & Co., Ltd.	1
Main, R. & A., Ltd.	Centre VII.
Manchester Oxide Co., Ltd.	51
McKelvie, James, & Co.	Wrapper I.
Metropolitan Vickers Electrical Co., Ltd.	—
Mewburn, Ellis, & Co.	51
Mitchell, H., & Co.	Wrapper I.
New Conveyor Co., Ltd.	—
Newton Chambers & Co., Ltd.	—
Orme, George, & Co.	2
Oughtibridge Silica Firebrick Co.	—
Parkinson Stove Co., Ltd.	Centre III.
Parkinson, W., & Co.	4, 20
Patent Retorts, Ltd.	1
Pearn, Frank, & Co., Ltd	16
Pearson, E. J. & J., Ltd.	—
Peckett & Sons, Ltd.	60
Peebles & Co., Ltd.	57
Penney & Porter, Ltd.	—
Perfecta Meters, Ltd.	57
Phillips, J. W. & C. J., Ltd.	—
Piggott, Thos., & Co., Ltd.	59
Pitman, Sir Isaac, & Sons, Ltd.	—
Pneumatic Conveyance and Extraction (1929), Ltd.	—
Pocock, Herbert	—
Potterton, T. (Heating Engineers), Ltd.	45
Premier Gas Engine Co., Ltd.	—
Progas Co., Ltd.	55
Pulsometer Engineering Company	—
Purimachos Ltd.	—
Quasi-Arc Co., Ltd.	—
Radiation Ltd.	Centre IV., V., 9, 17
Raschig, Dr. F., G.m.b.H.	—
Reavell & Co., Ltd.	56
Richmonds Gas Stove Co., Ltd.	9
Rigby, John, & Sons, Ltd.	—
Riley, A. J., & Sons, Ltd.	—
Riley, John, & Sons, Ltd.	51
Robinson, J. H., & Co. (L'pool), Ltd.	59
Ross, Chas., Ltd.	51
Rotary Meter Company, Ltd.	12
Rotherham and District Collieries Association, Ltd.	—
Ruscoe, John, & Co., Ltd.	—
Sawer & Purves	—
Scottish Tube Co., Ltd.	—
Sentinel Waggon Works, Ltd.	—
Sheepbridge Coal and Iron Co., Ltd.	—
Siebe, Gorman, & Co., Ltd.	—
Simon-Carves, Ltd.	8
Smith Meters, Ltd.	Centre IX.
Solent Engineering Co., Ltd	—
South Metropolitan Gas Company	—
Spencer-Bonecourt, Ltd.	—
Spencer Chapman & Messel, Ltd.	51
Stanton Ironworks Co., Ltd.	Centre IX.
Staveley Coal and Iron Co., Ltd.	—
Stein, J. G., & Co., Ltd.	—
Stewarts and Lloyds, Ltd.	Wrapper I.
Stothert & Pitt, Ltd	—
Strachan & Henshaw, Ltd.	52
Stringer Bros.	—
Sugg, Wm., & Co., Ltd.	3
Super-Centrifugal Engineers, Ltd.	—
Taylor, Joseph (Saturators), Ltd.	60
Thomas & Bishop, Ltd.	16
Thompson, J. (Wolverhampton), Ltd	49
Tilghman's Patent Sand Blast Co.	—
Tilley Bros., Ltd.	56
Torbay Paint Company, Ltd.	—
Trier Bros., Ltd.	—
Trotter, Haines, and Corbett, Ltd.	52
Tully Sons & Co., Ltd.	—
Turner Brothers Asbestos Co., Ltd.	—
Turner, F. (Art Metal), Ltd.	15
Vertical Gas Retort Synd., Ltd.	Wrapper I.
Vickery, J. H., & Co., Ltd.	—
Wailes Dove Bitumastic, Ltd.	14
Walker, C. & W., Ltd.	4
Walker, Crosweller, & Co., Ltd.	16
Waller, Geo., & Son, Ltd.	2
Walworth, Ltd.	—
Waterless Gasholder Co., Ltd.	10
Wellington Tube Works, Ltd.	—
Welsbach Light Company, Ltd.	8
West's Gas Improvement Co.	Centre X.
Westwood & Wrights, Ltd.	60
Whessoe Foundry and Eng. Co., Ltd.	Wrapper I.
Wholesale Fittings Co., Ltd.	6
Willey & Co., Ltd.	Centre VIII.
Williamson Cliff, Ltd.	Wrapper IV.
Wilson (George) Gas Meters, Ltd.	Wrapper I., 7
Wilsons & Mathiesons, Ltd.	—
Winn, Paul, & Co., Ltd.	15
Woodall-Duckham Co., Ltd.	Centre I.
Woolley, James, Sons & Co., Ltd.	—
Wright, Alex., & Co., Ltd.	52
Wright, John, & Co.	—

Appointments Vacant and Wanted	51, 52
Company Notices	52
Contracts Open	52
Educational	52
Gas Undertaking for Sale	—
Patent Exploitation	—
Plant, &c., for Sale and Wanted	52
Stock Issue	49

CONTENTS

EDITORIAL NOTES.

A GLANCE AT THE CONTENTS . . . 81
Distant Pressure Control 82
Rating and Bulk Supplies 82
Oxide Purification 83
High-Handedness 83
The Water Heating Load 84
B.I.F. Birmingham Catalogue—Gas Street Lighting in London—Progress of Waterless Holders—Fuel Research Board and Coke Ovens 84

Personal 85
Obituary—
John Foster 85
Forthcoming Engagements 85

THE NEWS OF THE WEEK.

Dewsbury Corporation—Fire at Messrs. F. Turner (Art Metal), Ltd.—Bradford Corporation Gas Committee—"Monthly Accounts in Relation to Gas Companies"—Sale of Gas at Wigan—Dundee Tar Distillation Works—Birmingham Gas Department—South Metropolitan Employees to Entertain Children—Port Talbot Council and Gas Coals—Newcastle-upon-Tyne Gas Employees and Medical Charities—Norwich Gas-Works Recreation Club—Spenborough Urban District Council—Leeds Corporation and Overlapping—New Holder for Elland-cum-Greetland . 86
The Gasholder as Advertising Medium . . 86

THE NEWS OF THE WEEK—(*continued*).

Institution of Mechanical Engineers—Formation of Southern Branch 86
New Industry in New Zealand—Gas Meter Making at Christchurch 87
Increasing Uses of Gas—The Industry's Part in Sheffield Trade Supplements 87

Home Baking Competition in Newcastle . 88
Attractive Christmas Window Displays . . 89
In Continental Countries—Abstract Translations from the Technical Press of France and Germany 90
Notes on New Books 90

THE "JOURNAL" TECHNICAL RECORD.

Western Junior Gas Association—
Distant Pressure Control. By H. C. Widlake, A.M.I.E.E. 91
Purification of Town Gas by Means of Oxide of Iron. By J. Dreverman 97
Fuel Research Board—Report for Year Ended March 31, 1930 100
Water Heating by Gas 101
Physical and Optical Societies' Exhibition—Excellent Demonstration by the Gas Light and Coke Company 104
London and Southern District Junior Gas Association—
Visit to the East Greenwich Works . . . 104

Parliamentary Bills for 1931 105

REGISTER OF PATENTS.

Dry Gas Meters—Alder & Mackay, Ltd, and Anderson, J. 106
Retort Doors—Dempster, R. & J., Ltd., and Holt, C. E. 106
Expansion Joints for Retort Settings—South Metropolitan Gas Company and Seach, W. T. 107
Non-Suicide Gas Ovens—Smith, H. 107
Dry Gas Meters—Kirkewhite Engineering Company, Ltd., and Goldspink, G. E. . . 107

GAS MARKETS AND MANUFACTURES.

Stock Market Report 108
Current Sales of Gas Products 108
Trade Notes 108

Diaries, Calendars, &c., Received 108
Gas Acts (1920 and 1929) Orders 108

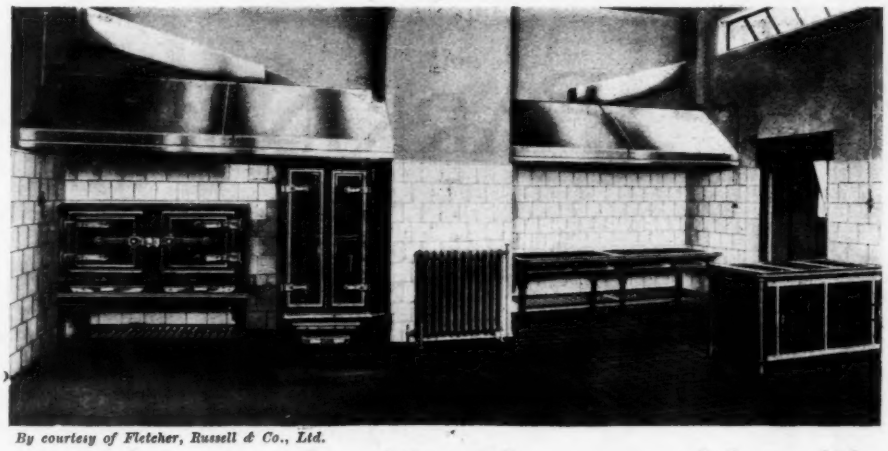
LEGAL INTELLIGENCE.

South Metropolitan Employee Sentenced . 108

Stock and Share List 109

"JOURNAL" Telephone: Central 2236-7 (2 lines)

For Advertisers' Index—see p. 114



By courtesy of Fletcher, Russell & Co., Ltd.

. . . to economy, add rustlessness and long life.

The aluminium canopy is light and therefore economical to buy. Add the rustlessness of the metal to its resistance to the products of gas combustion and you have a triple reason for the increasing popularity of such canopies. The same reasons commend the metal for connections, globe galleries and diffusers, meter parts, fire surrounds, flue pipes, oven linings, warehouse lamp bodies and reflectors and water heater tops.

Let aluminium paint keep your gasholders cool

G.J.14.1.31.

Aluminium

THE BRITISH ALUMINIUM CO. LTD.
ALUMINIUM PRODUCERS. ADELAIDE HOUSE.
KING WILLIAM STREET, LONDON, E.C.4.

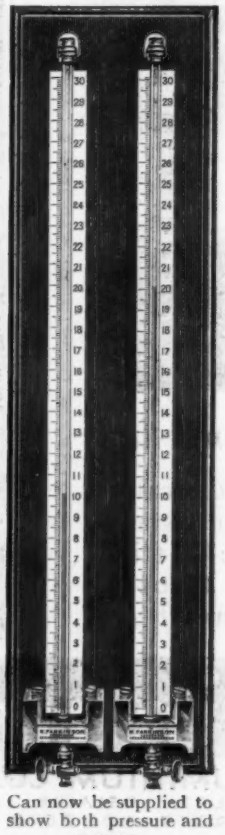
'Phone: Mansion House 5561 (3 lines) and 8074 (2 lines).

'Grams: Cryolite, Bilgate, London.

100% BRITISH

The THOMAS GLOVER METER

BUILT AT THE GOTHIC WORKS
EDMONTON, LONDON, N. 18



Can now be supplied to show both pressure and vacuum.

PARKINSON'S

SINGLE TUBE GAUGES

One Pattern, Interchangeable.
Pressure, Vacuum, Differential.
Scale starts from
ZERO
Inches of Water
Inches of Mercury
lbs. per sq. in.

W. PARKINSON & CO.,

INCORPORATED IN PARKINSON & COWAN (GAS METERS), LTD.

COTTAGE LANE, CITY ROAD, LONDON, E.C.1.
Telegrams: "INDEX, 'PHONE, LONDON."
'Phone Nos.: 4270 Clerkenwell

BELL BARN ROAD, BIRMINGHAM.
"GASMETERS, B'HAM."
2245 Midland, B'ham.

RAPHAEL STREET, CROMAC STREET, BELFAST.
"PREPAYMENT, BELFAST."
3374 Belfast.